Orange & Rockland

Climate Change Resilience Plan

November, 2023

Case# 22-E-0222

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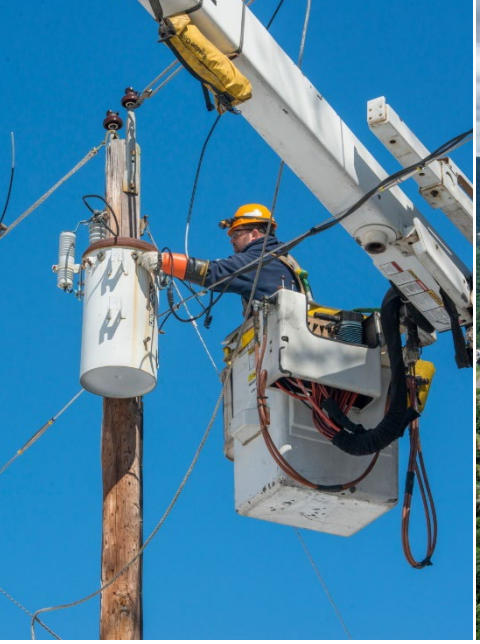
Abbreviations

AI	Artificial Intelligence
AMI	Advanced Metering Infrastructure
BFE	Base Flood Elevation
CAIDI	Customer Average Interruption Duration Index
CCRP	Climate Change Resilience Plan
CCVS	Climate Change Vulnerability Study
CJWG	Climate Justice Working Group
CLCPA	Climate Leadership and Community Protection Act
CRRG	Climate Change Risk and Resilience Group
CRWG	Climate Resilience Working Group
DA	Distribution Automation
DAC	Disadvantaged Communities
DPS	Department of Public Service
ERM	Enterprise Risk Management
FEMA	Federal Emergency Management Agency
GMLC	Grid Modernization Laboratory Consortium
HVAC	Heating, Ventilation, and Air Conditioning
IDF	Intensity-Duration-Frequency
MIT	Massachusetts Institute of Technology
MOAB	Motor Operated Air Break
NRI	Network Resiliency Index
NYS PSC	New York State Public Service Commission

NYSERDA	New York State Energy Research and Development Agency
OHPOT	Overhead Program Optimization Tool
OMS	Outage Management System
O&R or the Company	Orange & Rockland Utilities, Inc.
PPE	Personal Protective Equipment
PSL	New York State Public Service Law
R&D	Research and Development
RAP	Resilience Analysis Process
RCP	Representative Concentration Pathway
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
TV	Temperature Variable
UAV	Unmanned Aerial Vehicle
UHI	Urban Heat Island
USACE	United States Army Corps of Engineers
USS	Unit Substation



Executive Summary

Orange and Rockland Utilities, Inc. (O&R or the Company) provides electric service to over one million residents who live within the O&R service territory. As society becomes increasingly dependent on resilient, reliable electricity, climate change is bringing more frequent and severe storms, flooding, icing events, and heat waves that impact the electric delivery equipment and cause outages that impact our customers.

The Company has already been taking action to plan, build, and maintain a resilient energy system in order to withstand increasing extreme weather events and more needs to be done. In the last decade, O&R invested over $83 million in resilience initiatives to strengthen its system.[1] O&R has learned and benefited from the work of its affiliate, Consolidated Edison Company of New York, Inc. (Con Edison). Specifically, Con Edison's 2020 Climate Change Implementation Plan, which was developed to systematically incorporate climate change into its planning, design, operations, emergency response, and investment planning practices changed the culture of the organization to embed resilience as a priority.

O&R submits this Climate Change Resilience Plan (CCRP or the Plan) as required by New York State Public Service Law (PSL) Section 66 (29). This Plan identifies actionable and cost-effective adaptation strategies that will support O&R's customers by addressing emerging and remaining risks from the Company's recently published Climate Change Vulnerability Study (CCVS). This Plan represents the Company's comprehensive and cohesive strategy to achieve the objectives of PSL Section 66 (29) — mitigation of climate change impacts, reduction of restoration timeframes and related costs, and enhancement of reliability. The projects and programs proposed in this Plan constitute a unified whole that will provide customers with synergistic benefits. O&R is committed to continuous improvement and will update this Plan at a minimum of every five years to incorporate updated climate science projections.

For O&R, investing in climate resilience continues to be a priority and minimizing the current and future impacts of climate change requires immediate action. The Company is committed to

basing its planning decisions on the best available climate science and has invested in comprehensive climate science studies to inform its work.

Stakeholder Engagement

O&R recognizes that stakeholder engagement is a crucial component of the resilience planning process. Therefore, O&R has engaged stakeholders and collaborated with third parties, such as peer utilities, throughout the development of this Plan. The engagement effort was designed to identify stakeholders' key concerns, challenges, and goals; collect and consider best/effective practices and expertise; integrate stakeholder feedback; and provide transparency and insight into the climate study process and outcomes.

O&R convened a group of stakeholders to serve on the CCRP Climate Resilience Working Group (CRWG), which provided input and feedback for both the CCVS and the CCRP throughout the project. O&R plans to continue its outreach and engagement with third-party stakeholders as it implements its resilience efforts.

Multi-Pronged Resilience Strategy

O&R is building on its existing resilience management framework through this CCRP. This framework employs a multi-pronged, forward-thinking strategy that emphasizes the importance Incorporating climate change into existing processes and practices, managing climate change risks, and building resilience. This approach extends beyond individual assets and isolated events to holistically address the spectrum of potential climate impacts across Company operations. Consistent with the new statutory requirements for Resilience Plans,[i] O&R's investments will increase resilience to extreme events, decrease customer outages, and reduce restoration costs.

In addition to the targeted resilience investments in this Plan, O&R is taking action to make every investment decision climate informed. Recognizing the need for a comprehensive approach to resilience, the Company embeds resilience considerations into its planning, design, operations, and emergency response, including adopting an internal design guideline that reflects the most recent climate change projections.

This strategy allows the Company to address various climate factors that threaten grid integrity by leveraging a variety of tools that drive system resilience. This approach also allows the Company to leverage synergies among resilience measures, improve efficiency by streamlining operations, and maximize the impact of resilience investments. The main strategies of O&R's resilience management framework are to **prevent**, **mitigate**, and **respond** to the climate change vulnerabilities identified in the CCVS. The Company integrates customer communication and outreach throughout all strategies. O&R classifies its resilience efforts into three strategic

[i] Public Service Law §66(29).

areas: **resilience-driven investments; incorporating resilience into planning, design and operations;** and **application of new technologies**.

O&R also uses a flexible approach to support continued adaptability over time. This approach allows for future iterations of this Plan to consider new climate data and lessons learned from previous efforts. O&R's commitment to continual learning and adaptation places the Company at the forefront of resilience planning and positions the Company to meet the challenges of a changing climate.

O&R considers impacts beyond the immediate scope of its resilience investments and accounts for the co-benefits that these actions may deliver such as reduced costs, sustained environmental excellence, and improved service for customers. This broad perspective amplifies the overall value and effectiveness of O&R's efforts for customers.

O&R has a long history of employing innovation and state-of-the-art technologies to enhance the resilience of its systems and operations. O&R is exploring and implementing new technologies, striving to promote new resilience projects. By integrating modern technological solutions and maintaining the flexibility to adopt future advancements, O&R is enhancing its preparedness for the increasing intensity and frequency of climate-driven events.

Consideration of Equity

O&R recognizes that the impacts of climate change and extreme weather events can disproportionately fall upon disadvantaged or overburdened communities. These communities tend to be the most exposed to and the most sensitive to various climate hazards. They are also less likely to have alternative access to heating or cooling services and more likely to experience food spoilage and shortages and delayed or disrupted access to healthcare.

The Company recognizes the importance of equity and its crucial role in energy resilience planning, and it has been deliberate about working to incorporate equity into the planning process and tracking the equitable distribution of resilience programs. The Company is committed to tracking and reporting on the distribution of its investments and the number of outages in disadvantaged communities relative to other communities.

O&R, jointly with Con Edison, has also formed an Environmental Justice Working Group and plans to release a finalized Environmental Justice Policy Statement later in 2023. The Company will use that document as a guide for considering equity in all of the Company's operations and investments.

Investment Plan

The set of projects and programs included in the Investment Plan have been developed to holistically address prioritized climate change risks, as identified in the CCVS. Considerations included:

- Previous and ongoing resilience work;
- Factors like technical feasibility and co-benefits;
- How the solutions will complement each other to protect the electric system; and
- The ability to prevent, mitigate, and respond to extreme weather.

The resulting comprehensive Investment Plan details the full portfolio of the Company's resiliency investments, including programs and projects that have already been successfully part of O&Rs resiliency portfolio of investments for several years and are being enhanced through this resiliency initiative. The details, costs, and implementation schedules of these programs and projects are set forth in the individual white papers included in Appendix 5: Project and Program Details.

To implement this portfolio of resiliency investments and programs, O&R expects to spend approximately $411M in the first 5 years (2025-2029). The Company currently projects that this level of expenditure will result in a 7-8% annual increase in electric rates. It is important to note that O&R is preparing to file a base rate case in January 2024 that will cover the first three of this five-year period. This resiliency portfolio of investments and programs will also be included in that and future base rate case filings. In the Company's upcoming base rate case filing, the specific impact of these investments on electric rates will be detailed, providing a clear link between the resiliency initiatives and any proposed base rate adjustments.

For the 15 years beyond the initial 5 years, (2030 through 2044), the Company will continue to study the impacts of climate change and implement resilience programs and currently projects at an estimated order of magnitude cost of $1.1 billion. These programs will allow O&R to mitigate and respond to current and projected climate risks such as heat waves, extreme weather events, sea level rise, and inland flooding to prevent outages, minimize customer impact, and restore service faster in the event of an outage.

Governance

O&R is joining Con Edison in their adoption of a joint corporate climate governance structure to manage climate risks and resilience and consider climate change in the Company's core functions. This structure enables the Company to maintain progress by incorporating climate change into the Company's design, operations, and planning.

The joint governance structure includes a corporate instruction, internal design guidelines, executive oversight, a Climate Risk and Resilience Executive Committee, and a Climate Risk and Resilience Group. It also includes public reporting on the Company's risk management activities and financial risks related to climate change impacts. These governance components work together to help O&R sustain climate change adaptation efforts while providing guidance, support, and oversight.

Performance Measures

O&R will use resilience performance measures to track the implementation and effectiveness of resilience investments, via implementation-based and outcome-based measures. Resilience performance measures are an active area of research and there is currently no industry standard; however, O&R is proposing measures with which to evaluate resilience programs going forward.

Conclusion and Next Steps

O&R's approach and investments described in this Plan will help the Company continue to provide safe, reliable, and resilient energy to its customers. This Plan identifies short-, intermediate-, and long-term resilience investments that will address the known risks of climate change, informed by the latest climate projections and literature relevant to its service territory, as well as input from stakeholders and considerations of equity. The Company respectfully requests that the New York State Public Service Commission (NYSPSC) approve this Plan in its entirety. Upon approval by the NYSPSC, O&R will work on the implementation of this Plan, meeting with stakeholders at least twice per year and reporting every other year on the identified performance measures, equity considerations, and status of investments.

Introduction

Orange and Rockland Utilities has long been committed to providing a safe, reliable, and resilient energy delivery system for its customers. This commitment took on new meaning and weight in 2012 after Superstorm Sandy devastated O&R's service territory and its infrastructure, knocking out power to more than 80 percent of its customers. Since Superstorm Sandy, the Company has identified and applied new understandings regarding the impacts of climate change to enhance system resilience. O&R has already initiated a broad set of resiliency programs designed to reduce the number, scope, damage, and duration of power outages caused by extreme weather.

From 2012 through 2022, the Company invested more than $83 million in resilience initiatives to strengthen its energy systems.[2] Examples of the Company's investments include strengthening critical facilities, selective undergrounding projects, and upgrading technology to better communicate restoration times to customers. The Company also updated its clearance and pole design class standards to reflect the lessons from Superstorm Sandy.

From 2012 through 2022, the Company invested more than $83 million to improve the resilience of its electric system.

O&R recognizes that investing in climate resilience is a necessity and that minimizing the current and future impacts of climate change requires continuous action both now and into the future. Climate change threatens O&R's electric system and, in turn, threatens customer safety and the growing economies which O&R supports. O&R has therefore developed resilience investments and operational changes that will help address the risks from climate change.

To further strengthen the Company's resilience to the effects of climate change and extreme weather events, O&R has committed to understanding local climate change projections and science, identifying potential system vulnerabilities, and acting to prepare its infrastructure for

higher temperatures, intense precipitation, and extreme weather events. By gaining a better understanding of vulnerability across its service area, O&R will be better able to prioritize investments and strengthen critical infrastructure more effectively. This Climate Change Resilience Plan (CCRP or Plan) builds upon and addresses important results from the Company's Climate Change Vulnerability Study (CCVS) filed with the NYSPSC in September 2023.[ii] Above all, this Plan identifies actionable investment options that will help O&R to continue providing safe and reliable service to its customers. The Plan proposes storm hardening and resiliency measures to mitigate the impacts of climate change to utility infrastructure, reduce restoration costs and outage times, and enhance resiliency during extreme weather events.

Legislative Context

In February 2022, New York enacted a new section to PSL, §66 (29),[3] which requires major New York electric utilities to conduct a CCVS and develop a CCRP. The goal of the CCVS and CCRP is to better prepare utilities for the adverse effects of climate change and severe weather events. O&R, along with other investor-owned electric utility companies subject to the PSL §25-a[4], were required to submit a CCVS within 18 months of the legislation's enactment (O&R's submittal was on September 22, 2023), and a CCRP 60 days thereafter.

O&R's CCRP provides a comprehensive long-term roadmap and investment strategy to address climate risks identified by the CCVS for the next 5-, 10-, and 20-year periods. Informed by the findings from the Company's CCVS, the CCRP establishes O&R's plan to address prioritized vulnerabilities and aims to achieve the following goals, as required by PSL §66.

- Mitigate the impacts of climate change to O&R's infrastructure, reducing restoration costs and outage times associated with extreme weather events, and enhancing reliability;
- Incorporate climate change into O&R's existing processes and practices, including planning, design, operations, and emergency response;
- Propose adjustments, as necessary, to how the Company plans and designs infrastructure for the increasing impacts from climate change.[5]

O&R's CCRP is comprehensive, and also meets the law's requirements to establish a systematic approach and multi-pronged strategy to address the impacts of climate change, reducing restoration and outage times and enhancing electric infrastructure resiliency. Because the Plan is a complete package of needed resilience investments, it includes funding for both new and

[ii] The CCVS report is available at https://www.oru.com/en/our-energy-future/our-energy-vision/our-climate-change-resiliency-plan.

expanded programs and, as detailed in the Investment Plan section, the Company is seeking authorization for all new resilience spending during the first five years of the Plan.[iii]

Climate Change Vulnerability Study Summary

The O&R service territory has already experienced impacts from extreme weather events. For example:

- Severe thunderstorms in July 2023 caused thousands of customer outages in the O&R service territory due to damaging lightning, heavy rainfall, and downed trees.[6] Orange County received over 7 inches of rainfall in one day, the equivalent to a 1-in-1000-year rainfall event for the area.[7]
- From April 18-20, 2022, a nor'easter brought 50 mph wind gusts and up to 18 inches of snow to parts of New York, causing power outages and service restoration delays.[8] On September 1, 2021, the remnants of Hurricane Ida brought heavy rain to the region.[9] Directly following Hurricane Ida, an EF3 tornado hit Mullica Hill, New Jersey, and the first tornado emergency of its kind was issued in the Northeast.[10]

The remnants of Hurricane Ida in 2021 brought flash flood and tornado warnings to the service area, causing transit shutdowns, widespread flooding, and power outages.

- A brush fire, sparked by a freight train owned by the CSX railroad company,[11] impacted Rockland County in April 2023. The fire burned approximately 50 to 70 acres across Rockland County and forced over 100 people to evacuate. Almost 50 O&R wood poles were damaged in the event and had to be replaced.

The purpose of the CCVS was to develop an understanding of the risks that climate change poses to the Company's electric system in the future, and to inform the development of this CCRP. The CCVS provided:

- A presentation of projected changes in climate affecting the O&R service territory based on the latest science and recent research studies;
- A prioritization of specific climate hazards that may impact the O&R electric system; and

[iii] The Company is not bifurcating needed resilience investments between resilience plans and rate cases because such a process would conflict with the requirement to present a "systematic approach" and a "multi-pronged strategy." Bifurcation does not consider the requirement that the Commission incorporate approved resiliency funding directly into base rates without further review, as well as the requirement that the review of the resilience plan be separate from a corporation's rate proceeding.

- A suite of potential adaptation strategies that O&R has further evaluated and selected from in this CCRP.

The CCVS leveraged the latest climate projections and literature to develop a full understanding of how climate change may manifest in the coming years and impact the O&R service territory. These sources include:

- New statistically downscaled global climate projections developed by Columbia University and supported by the New York State Energy Research and Development Authority (NYSERDA) in 2022;[iv]
- Sea level rise projections from Columbia University and NYSERDA;
- Updated rainfall projections from the Cornell intensity-duration-frequency (IDF) curves;
- Prior information from a Massachusetts Institute of Technology (MIT) study for National Grid with wind and ice projections;[v] and
- Numerous research papers and academic studies.

As described in O&R's CCVS, climate change will have significant impacts on the Company and its customers. Primary findings from the climate change projections developed for this Study are summarized below in Table 1.

Climate Hazard	Summary of Projections
	Both **average air temperatures** and **extreme heat will increase**. For example, the number of days where maximum temperatures exceed **95°F could reach 35 days per year** by 2050 in Dobbs Ferry, compared to the baseline of 4 days.
	Multiple flooding sources can occur at once and exacerbate impacts. Increased precipitation, along with sea level rise, present flooding risks throughout the O&R service area. **Precipitation** projections show a shift relative to historical norms. This could **increase deluge precipitation events**—short-duration, high-intensity rainfall—that may impact municipal stormwater systems and result in inland flooding.
	Additionally, O&R's service area is expected to experience 16 inches of **sea level rise** by 2050. Sea level rise will heighten flooding along the banks of the Hudson River, potentially increasing the perpetual inundation of coastal

[iv] Downscaled from the Coupled Model Intercomparison Project 6 (CMIP6) dataset.
[v] The data were developed by the MIT Joint Program on the Science and Policy of Global Change as described in Komurcu and Paltsev (2021), MIT Joint Program Report 352, available at: https://globalchange.mit.edu/publication/17608

	assets. With increased deluge precipitation, the risk of flooding is compounded.
	**Wind and ice projections** remain the **most uncertain**. A review of external scientific studies indicates that the O&R service area is likely to experience **stronger wind gusts in the future due to intensifying storms**, particularly during tropical cyclones. While the frequency of the most extreme wind speeds during tropical cyclones is not expected to increase in the North Atlantic basin, more frequent high wind gusts could be observed during thunderstorms, although the magnitude of this trend is uncertain. In addition, there remains the potential for more **higher-intensity radial icing** events in the winter.
	New scientific research has strengthened and refined our current understanding of the direction changes and risks from **extreme events.** **Hurricanes** are expected to increase in intensity with a higher probability of northeast tracks due to a projected northward migration of strong hurricanes. The overall frequency of tropical cyclones in the North Atlantic basin is not expected to increase. **Snow and ice events** will decrease in frequency, but when they do occur, they could be more intense. **Cold snaps and polar vortex events** could become more frequent due to a weakening of the polar vortex, but the relationship between the warming arctic and cold air outbreaks is still uncertain and more research is needed. **Lightning and thunderstorms** could increase in frequency and intensity. **Drought** could increase in frequency and intensity, but these projections are characterized by a high degree of uncertainty. **Wildfires** could increase in frequency and intensity due to increasing temperature and drying patterns, though mitigation measures and investments in wildfire control measures lessen the degree to which climate change increases risk. **Concurrent and successive** extreme events are expected to increase in frequency and intensity.

Table 1. Summary of climate change projections from the CCVS.

Vulnerability is defined as the potential for assets or operations (and, by extension, customers) to be negatively affected by climate change. Vulnerability incorporates the degree to which assets may be exposed to climate hazards, as well as the potential impacts of exposure, as defined by infrastructure sensitivity. O&R considered exposure and asset sensitivity together to generate vulnerability rankings of high (red), medium (yellow), and low (green). The results of this analysis are summarized in Table 2 below.

	Temperature and Temperature Variable (TV)	Flooding	Wind & Ice
Substations	Moderate	High	Low
Overhead Transmission	Moderate	Moderate	Moderate
Overhead Distribution	Moderate	Low	High
Underground Transmission	Moderate	Moderate	Low
Underground Distribution	Moderate	Moderate	Low
Company Facilities	Moderate	Moderate	Low

Table 2. Summary of Vulnerability Findings

Low: Asset/system has low vulnerability to the given climate hazard.

Moderate: Asset/system is moderately vulnerable to the given climate hazard. Vulnerability is typically driven by assets' propensity to experience degradation from exposure to hazard overtime.

High: Asset/system is highly vulnerable to the given climate hazard. Vulnerability is typically driven by assets' high sensitivity or a significant expected increase in magnitude of given climate hazard, resulting in a high risk of major failure or severe degradation of service.

More detailed summaries of the physical and operational impacts of each hazard are provided in Appendix 1: Physical and Operational Hazard Impact Summaries.

Climate Resilience Working Group & Other Stakeholder Engagement

For its climate resilience planning to be effective, O&R recognizes that it must include the perspectives of a broad range of stakeholders, and leverage expertise beyond its own staff. O&R has collaborated and coordinated with other New York energy utilities and experts in climate science. This collaboration allows for sharing relevant resources (*e.g.*, climate science data) and best practices with a variety of stakeholders, including New York State Department of Public Service (DPS) Staff, municipality representatives, and advocacy groups for consumers, environment, and equity. Furthermore, O&R benefits from the work of its affiliate, Con Edison, particularly their first Climate Change Vulnerability Study and Implementation Plan.

This CCRP reflects the Company's extensive stakeholder engagement efforts, which captured the feedback, input, and experience of an engaged and diverse working group to support the Company's goal of serving communities' and customers' energy needs in the future. To encourage robust stakeholder engagement, the Company's outreach efforts included establishing a climate landing webpage, corporate affairs outreach, and participation in local municipality climate change events.

The robust stakeholder engagement was to:

- Identify stakeholders' key concerns, challenges, and goals;

O&R is committed to including stakeholders throughout the resilience planning process. This report represents broad stakeholder understanding and concurrence that the identified resilience investments are necessary for the continued operations of O&R's systems in a changing climate.

- Review best practices and expertise offered from third-party resources; and
- Provide transparency on the climate study process and outcomes.

O&R invited stakeholders to join its CCRP Climate Resilience Working Group (CRWG). The purpose of the CRWG was to provide input and feedback to the CCVS and CCRP throughout the project and to review interim results. Attendees represented organizations such as state agencies, cities and towns in O&R's service territory, local non-profit organizations, and more. A full list of the CRWG organizations and members that participated is provided in Appendix 2: CRWG Meetings.

Stakeholder Input

O&R has engaged CRWG members and its fellow New York utilities throughout this CCVS and CCRP process via meetings and surveys. Much of the feedback in these meetings and surveys informed the development of this CCRP.

CRWG Meetings

At the time of this CCRP's filing, O&R has convened six CRWG meetings, as described in Table 3.

CRWG Meeting Date	Meeting Focus
Meeting #1: August 10th, 2022	Climate science updates and the objectives and timeline for the legislation driven project.
Meeting #2: December 12th, 2022	Feedback from the survey and overview of CCVS process.
Meeting #3: March 29th, 2023	Climate change pathway selection and CCVS updates.
Meeting #4: June 22nd, 2023	CCVS updates and potential adaptation options to include in the CCRP.
Meeting #5: August 29th, 2023	CCVS updates and projects/programs in the Investment Plan section of the CCRP.
Meeting #6: October 30, 2023	CCRP draft feedback, review of proposed resilience portfolio.

Table 3. Climate Resilience Working Group Meeting Topics

CRWG Surveys

O&R distributed a survey to stakeholders to seek information on how O&R customers have been impacted by climate change and extreme weather events in the past and to provide feedback on how stakeholders would like to be engaged throughout the CCVS/CCRP process. This

information was used as input to the proposed climate science scenarios and CCVS/CCRP framework. Highlights from survey responses include the following:

- Respondents emphasized concerns about extreme weather events impacting reliable power in the O&R service territory, with the greatest emphasis placed on heavy precipitation and flooding;
- Over 70% of respondents indicated they have experienced severe impacts from weather events over the past five years, with almost half of respondents having taken action to evaluate climate-related risks to infrastructure and/or operations; and
- Respondents emphasized the importance of clear communication during and after extreme weather events.

Table 4 below summarizes CRWG feedback from across the survey and meetings and summarizes how it was incorporated into the CCVS and CCRP. More detail is shown in Appendix 3: CRWG Surveys.

CRWG Feedback	Actions Taken
Goals and Scope of Vulnerability Assessment CRWG members underscored the importance of study decisions and outcomes being transparent and accessible.	• O&R maintains a dedicated website and email for climate resiliency. • O&R has shared various datasets with stakeholders, along with justification for study decisions. • Wind and radial ice data were included as informational data to the NYSERDA/Columbia climate projections in the CCVS. This data provides a more granular snapshot of climate change in the near future to identify potential additional risks, but does not derive a probabilistic range of outcomes, so was not used in the Climate Change Planning and Design Guideline. • The Company chose both the Dobbs Ferry and Mohonk weather stations to represent the O&R service territory.
Climate Hazard Concerns CRWG members raised concerns about considering specific climate hazards, including flooding, extreme cold, Temperature Variable (TV), drought, and future water supply.	• The CCVS emphasizes the importance of projected increases in precipitation, sea level rise, and other hazards that increase flooding. Communities will benefit from O&R implementing resilience investments to their assets to improve service and reliability in their area. • The Company qualitatively analyzed difficult-to-model climate hazards in the CCVS, including cold snaps and polar vortices. • O&R included TV projections in the CCVS to represent increases in both temperature and humidity, which has consequent impacts on O&R's electric load.

CRWG Feedback	Actions Taken
	• Precipitation projections were included in the CCVS and provide insight into potential future drought. O&R also included a qualitative analysis of drought and wildfire in the CCVS.
Exploring other Projects and Programs CRWG members inquired about the use of other municipal Greenhouse Gas and Climate Change Assessments.	• O&R benchmarked their climate change pathway selection against other assessments, including Con Edison.[vi] • O&R will review other municipal assessments for benchmarking efforts in future iterations of the CCVS and CCRP.
Exploring Climate Adaptation Solutions and Grid Vulnerability CRWG members inquired about and recommended approaches to mitigate climate risks to the O&R system, including nature-based solutions like tree planting and geothermal, as well as the construction of energy efficient and high-performing buildings. However, these recommendations are not in scope for the CCVS and CCRP. CRWG members also raised concerns about grid vulnerability and transmission supply disruptions in the context of clean energy growth, corresponding demand increase, and summer peaks and electricity deficits as summer temperatures increase.	• Potential adaptation options were discussed at CRWG meeting #4 (June 2023). • CRWG feedback was used to inform identification of adaptation opportunities in the CCVS and CCRP. • The CCVS discusses the O&R electric system's vulnerability to climate hazards in detail.
Emergency Response Facilities CRWG members requested clarification on the distinction between each emergency response facility included in the Plan. These include the Storm Response Center, the Storm Materials Facility, and the Emergency Response Operations and Control Facility.	• O&R has included additional clarification in the Investment Plan section of this Plan, as well as the white papers for each program.

Table 4. CRWG feedback summary and actions taken.

[vi] Con Edison's CCVS and CCRP can be found on the Con Edison website (https://www.coned.com/en/our-energy-future/our-energy-vision/storm-hardening-enhancement-plan).

Multi-Pronged Resilience Strategy

O&R has developed a comprehensive resilience management framework to think strategically and innovatively about the portfolio of investments to reduce both near and long-term climate change risks. This framework emphasizes the importance of adaptable, resilient infrastructure and operational practices that anticipate changing climate conditions. This approach extends beyond individual assets and isolated events to comprehensively address the spectrum of climate impacts across operations. The objectives of O&R's investments are to increase resilience from extreme events, decrease customer outages and disruptions, and reduce restoration costs.

Past Investments

O&R's past investments demonstrate the Company's firm commitment to resilience across infrastructure and operations. Since Superstorm Sandy in 2012, O&R has invested over $83 million in New York to harden its electric system to prevent outages.

O&R's past initiatives to improve the Company's resilience have included:

Strategy	Hazard Addressed
Underground Electric Storm Hardening Projects	Wind and Ice
Tree-resistant Cables	Wind and Ice
Distribution Automation (DA) and Smart Grid Projects	Extreme Events
Vegetation Management (Tree-trimming clearances, hazard tree mitigation program)	Wind and Ice
Shoreline Erosion Protection Program	Flooding

Smart Meters/AMI	Multiple
Emergency Stand-By Contractor Agreements	Extreme Events
Emergency Stand-by Contractor Truck Fleet	Extreme Events

Table 5. O&R's past investments and hazards addressed.

As the Company navigates the evolving landscape of climate risks, it continues to refine its strategies, adapt its practices, and draw insights from past climate events. O&R is committed to continual learning and adaptation, which supports the Company's efforts to maintain reliable service and makes the Company well-prepared to meet the challenges of a new climate future.

Resilience Management Framework

Given the multifaceted nature of climate-related risks, no individual approach can provide the necessary comprehensive resilience. A multi-pronged integrated strategy will allow O&R to address various climate factors that threaten electric grid integrity by leveraging the tools that enhance system resilience, such as system hardening, data analytics, and load management (which involves optimizing the distribution of electricity based on demand). This holistic approach also leverages synergies among the various resilience measures, improving efficiency and maximizing the impact of the Company's investments. Key components of the framework include:

- Reducing the impact of climate-driven hazards;
- Considering solutions across planning, operations, engineering, and emerging technologies; and
- Maintaining adaptability.

The following sections describe how O&R will use this framework to develop and implement resilience work.

Reducing the impact of climate-driven hazards.

This principle focuses on reducing impacts by hardening the electric system, mitigating impacts of events by modifying system design to reduce customer impacts of damages, and increasing the Company's ability to respond to events and restore service expeditiously.

The central strategies of O&R's resilience management framework are to **prevent**, **mitigate**, and **respond** (see Figure 1 below) to the climate change vulnerabilities identified in the CCVS. Each of these strategies has consistently played a role in the Company's resilience approach, fortifying infrastructure and services against anticipated climate events and maintaining dependable service quality.

Figure 1. O&R's three strategies to address climate risks

"**Prevent**" encompasses proactive measures to both reduce climate change risks and enhance the reliability and resilience of O&R's electric system. "Prevent" investments are not necessarily a one-time event. Rather, the ability to prevent climate change impacts must be integrated and revisited throughout the life cycle of O&R's assets. Doing so requires changes in the planning, design, and construction of new infrastructure, ongoing data collection and monitoring, and investment in the upgrade of existing infrastructure using forward-looking climate information.

Example **Prevent** strategy: Elevation of sensitive equipment to avoid flood damage

"**Mitigate**" includes strategies and actions to reduce the consequences of climate events when they occur, because O&R cannot harden its energy systems for every possible future low-probability, high-impact extreme weather event. These actions serve to reduce damage during events and to protect exposed systems from further damage.

Example **Mitigate** strategy: Distribution automation through the use of devices such as MOABs, auto-loop circuits, reclosers, and smart capacitors.

"**Respond**" refers to improvements to reduce recovery times. Activities in this category involve the continuous improvement of O&R's emergency response efforts and outage management system to support swift response to power outages.

Example **Respond** strategy: Acquisition of additional spare parts to allow for faster restoration of power after an event.

Investing in Prevent, Mitigate, and Respond strategies will lessen the impact of climate hazard events and allow O&R to recover more quickly. Figure 2 visualizes the possible impact of a climate hazard event on O&R's service without resilience investment (left) and with resilience investment (right).

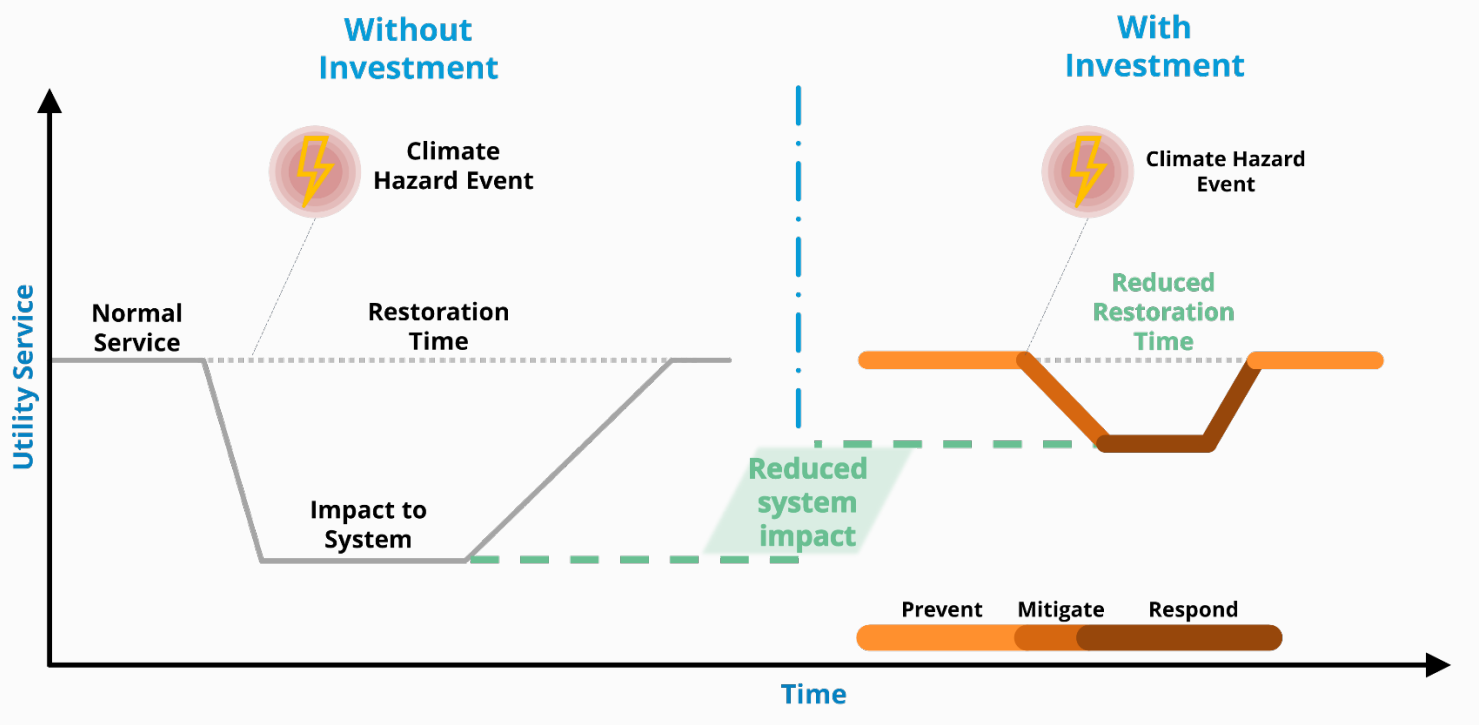


Figure 2. Visualization of how resilience measures can reduce the impacts of a climate hazard event on service.

The Investment Plan section of this CCRP provides more information on the full set of proposed investments across these strategies.

Considering solutions across planning, operations, engineering, and emerging technologies.

Updating planning and design approaches will help all Company strategies and investments to be more resilient. This is paired with strategic investments in existing infrastructure to enhance its resilience, and thoughtful consideration of new or emerging approaches to resilience that could be piloted.

O&R's resilience efforts are in the following categories: resilience-driven investments, incorporation of resilience into design and operations, and application of new technologies. O&R used this framework to define projects and process improvements, maintaining a consistent and strategic focus on enhancing resilience.

Maintaining adaptability.

The Company understands that climate change projections will continue to change. Therefore, adaptability is woven into the Company's resilience framework to allow for modifications and updates over time as climate science evolves and lessons are learned from implementation. This flexible approach allows O&R to develop an implementation plan for the near term, while

adjusting strategies based on updated climate conditions that emerge over 10- and 20-year planning horizons and in future iterations of the CCRP.

O&R may identify solutions to implement now that protect against near-term climate changes that are lower cost and foundational, while leaving options open to protect against plausible changes emerging later in the century. Figure 3 below depicts how O&R uses flexible adaptation pathways to maintain tolerable levels of risk.[12] As seen from light blue line, the key to flexible adaptation is continual monitoring and adjustments to keep the total risk level below the tolerable risk threshold.

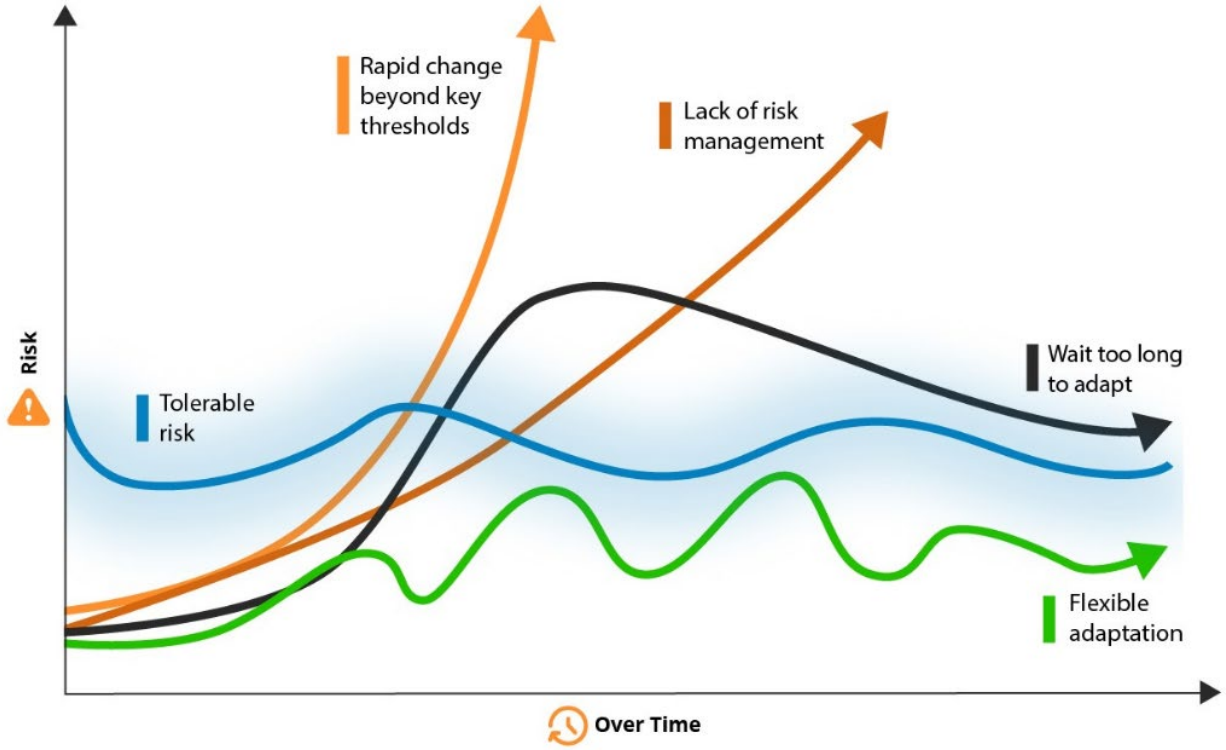


Figure 3. Flexible adaptation pathways in the context of tolerable risk and risk management challenges to non-flexible adaptation. Adapted from Rosenzweig & Solecki, 2014.

Investment Categories

O&R recognizes that its past investments have reduced outage times, but additional investments will be needed to address future climate change impacts. The forward-looking resilience projects and programs included in this CCRP follow the resilience management framework and encompass work that will address changing climate hazards as their primary objective.

Furthermore, O&R considers impacts beyond the immediate scope of its resilience investments with co-benefits such as reduced costs to customers, sustained environmental excellence, and improved customer relations. This broad perspective amplifies the overall value and effectiveness of O&R's resilience efforts.

Resilience-Driven Investments

Resilience-driven investments, such as those included in this Plan, include all programs and projects O&R will undertake to increase the resilience of its system. These investments are driven by climate science and O&R's understanding of its asset vulnerabilities.

The resilience-driven asset investments being proposed in this Plan are shown in Table 6 below, categorized by which strategy they support. More detail on each item is given in the Investment Plan section of this CCRP.

Prevent

- Shoreline Erosion Protection Program
- Transmission Overhead Structure Replacement Program
- Enhanced Overhead System
- Hazard Tree Removal Program Expansion
- Selective Undergrounding
- Hillburn 138kV Substation Flood Protection Project
- Summitville 34.5kV Substation Flood Protection Project

Mitigate

- NY Accelerated Smart Grid Distribution Automation Program
- Lovett 138kV Substation Flood Mitigation Project

Respond

- Con Edison and O&R Storm Resilience Center Project
- Storm Material Management Program
- Emergency Response Control Facility
- Micronet Weather Station Expansion Program

Table 6. Resilience-driven investments included in this Plan.

Incorporation of Resilience into Existing Planning, Design, and Operations

In addition to targeted asset-focused investments, O&R is embedding climate resilience considerations into its planning and operational activities, including the Company's' Climate Change Planning and Design Guideline that reflects the most recent climate change data.

This enables all projects, even those not originally designated as resilience efforts, to consider the impacts of climate change in their design and execution. For example, when planning capacity projects for substations to address increasing customer demand, the Company now incorporates future changes in temperatures (which can also drive increased demand) into its decision-making process. This includes higher temperature and TV projections used in power equipment ratings and load relief planning, sea level rise projections used in updated flood risk standards, and heavy rainfall and wind considerations. These considerations can lead to design modifications, such as flood walls, berms, or raising equipment, thereby reducing the risk of future climate impacts. Tools are provided in internal guidelines to assist with these updates and modifications, including information on how to adjust the Federal Emergency Management Agency (FEMA) Base Flood Elevation[vii] to account for sea level rise, and forward-looking rainfall intensity-duration-frequency curves.[viii]

Table 7 provides a summarized overview of the possible impacts of climate change on O&R's operations and the Company's planned adaptation actions.

Procedure or Practice	Climate Impacts	Planned Adaptations
Emergency Response	Higher temperatures, heavier rainfall, sea level rise, and more intense storms leading to more frequent activations of emergency response protocols.	Emergency response activation frequency has direct implications for O&R's operations budget, but future changes may also influence capital spending. It is possible O&R may incur more costs purchasing additional spare equipment, hiring additional staff, and pursuing other strategies to strengthen response

[vii] The most up-to-date FEMA FIRM map is the 2015 National Flood Hazard Layer ("NFHL") for the State of New York, which reflects the FIRMs done by each county. https://www.fema.gov/flood-maps/national-flood-hazard-layer

[viii] This information is publicly available through Cornell University (http://ny-idf- projections.nrcc.cornell.edu/index.html).

		capabilities and lower service restoration times.
Vegetation Management	Higher temperatures and more atmospheric carbon dioxide leading to faster vegetation growth and more frequent contact with lines.	O&R will consider increasing vegetation monitoring and expanding the hazard tree removal program. O&R will also work to develop a process for using the monitoring results to inform changes in practices. O&R will evaluate and consider the introduction of additional technologies or inspection methods to improve robustness of current vegetation monitoring and management practices.
Design Standards	Increased exposure to hazards including heat events, flooding, and windstorms may exceed current standards for a variety of assets throughout O&R's electric system, causing potential shortening of asset lifespans, or in select cases, asset failure.	O&R will continue reviewing design standards and specifications against updated climate change projections to determine if/when updates are necessary. O&R will also consider flooding projections and sea level rise when constructing new assets.
Reliability Planning	Gradual increases in average temperatures and in duration of heat waves, alongside increases in the frequency and severity of storms, have the potential to impact reliability and may require adjusting planning processes.	O&R's annual reliability assessments will consider an increase in the future severity and frequency of heat waves in accordance with the company's selected climate change pathway – particularly for assessments conducted for the distribution and sub-transmission systems. In order to execute on this recommendation, O&R may need new reliability modeling capabilities to understand the correlation between weather events and

		reliability. Observational gaps will be filled between existing weather stations.
Load Forecasting and Relief Planning	O&R's forecasting group projects a 1° F increase in TV equates to an increase of 48MW of system load. This has the potential to affect O&R's ability to deliver reliable electric service.	O&R has already incorporated the projected increase in TV into its load forecast. Load relief planning processes will include updated load forecasts and power equipment ratings that incorporate climate change projections. Future forecasts will also include line items specifying the incremental load impacts from climate change.
Workforce Safety	The most direct impact to worker safety in the O&R service territory will likely come from increasing average temperature and humidity, which can cause higher heat index and more high heat index days.	O&R will continue to monitor climate data for impacts on worker safety and evaluate whether additional heat stress protocols for climate change adaptation are warranted in the coming decade. O&R will consider joining CECONY for an annual heat stress training that is based on NIOSH20 guidelines and industry standard practices. O&R may develop a predictive risk-based tool or process to help assess the impact that decreased worker hours could have on system reliability.
Asset Management	In general, climate change is likely to have a negative impact on O&R's assets, leading to shorter asset lifespans on average.	O&R engineers and planners will continue to monitor asset life and adjust replacement schedules as needed.

Spare Equipment Management	Climate change is expected to cause an increase in the frequency and intensity of extreme storms, which can cause high wind speeds and flooding. While O&R maintains enough spare stock to respond to an event of a similar magnitude to Superstorm Sandy, that may not be sufficient for a larger storm or a series of multiple storms occurring close together.	O&R is proposing to construct a Storm Material Management facility in its service territory to stock a reserve of critical equipment. This is aimed at strengthening response capabilities for both larger-scale and consecutive emergency events, in line with the anticipated challenges of future climate change.

Table 7. Incorporating climate change into procedures and practices.

Application of New Technologies

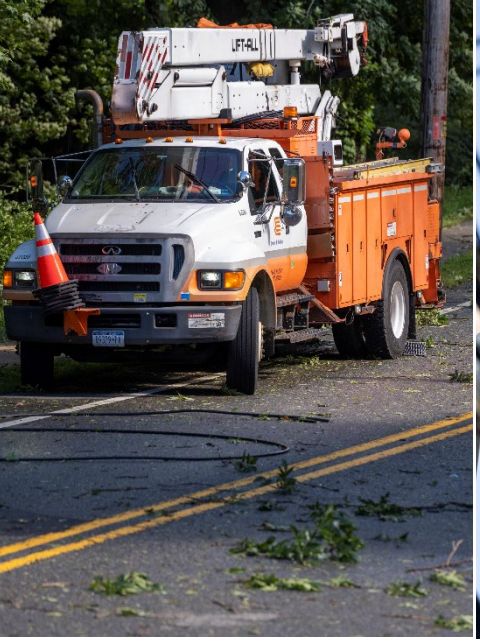
O&R seeks to identify and employ state-of-the-art technologies to enhance the resilience of its systems and operations. In partnership with Con Edison, O&R plans to make investments in promising new technologies that position the Company to be recognized as an innovator and leader in the energy sector, as well as set new standards for resilience projects within the State. By integrating modern technological solutions and keeping the flexibility to adopt future advances, O&R is enhancing its preparedness for the increasing intensity and frequency of climate-driven events.

Moving forward, O&R will pursue the following three approaches to identify and evaluate the latest developments in resilience technologies.

1. **Identifying system needs and existing capabilities** – Evaluating areas of system performance that need new resilience solutions will help O&R focus its search for technologies that will have the greatest impact.
2. **Monitoring industry developments** – Tracking new technologies and approaches developed by national laboratories and the private sector, while also engaging with other electric utilities to understand how they are deploying new technologies in this area, will help O&R continue to innovate.
3. **Partnering to develop new technologies** – Working with government and industry to bring the newest energy resilience technologies from the lab to the grid may involve sharing system data, providing opportunities for testing equipment, or access to the advice of O&R grid experts.

All three of these approaches are designed to confirm that O&R is not just deploying cutting-edge energy resilience technologies but playing its part in fostering market development of new

solutions. O&R's research and development (R&D), engineering, and meteorology teams play a crucial role in the Company's resilience enhancement efforts. Work from R&D teams is reflected in numerous ongoing projects, ranging from safety improvements, such as smart alarm logic and autonomous drone inspections. Through its proactive approach and successful application of new technologies, O&R hopes to contribute to an industry-wide evolution of resilience strategies and solidify its reputation as a forward-thinking leader in the field.



Consideration of Equity

O&R recognizes that the impacts of climate change are disproportionately falling upon overburdened communities (also called disadvantaged communities, or DACs).[13] For details on how O&R defines DACs, see Appendix 4: Defining Overburdened/Disadvantaged Communities. These communities tend to be the most exposed to and the most sensitive to climate hazards. The combined impact of extreme weather and power outages exacerbates existing inequities in overburdened communities.[14,15,16] For example, overburdened communities are more likely to lack access to heating or cooling services, experience food spoilage and shortages, and experience delayed or disrupted healthcare services.[17]

Historically, the Company has addressed equity concerns primarily through its low-income assistance and affordability programs. In the Company's most recent base rate cases,[18] the NYSPSC concluded that the Company's electric and gas low-income assistance and affordability programs were consistent with the NYSPSC's Energy Affordability Policy. The NYSPSC noted that the Company continues to provide funding for payment assistance available to O&R's customers who have difficulty paying their utility bills in a timely fashion due to financial circumstances. The level of funding projected for the bill discount credits comports with NYSPSC policy. In addition, the Company continues to waive its reconnection fee for any customer enrolled in the Company's Low-Income Program.

O&R is actively considering how these communities may be disproportionately affected by climate change and what the Company can do to enhance resilient service for them. O&R is committed to factoring equity into its prioritization framework for the implementation of this Plan.

O&R's Commitment

O&R recognizes the importance of equity and its crucial role in energy resilience planning. The Company has been deliberate about incorporating equity into the current planning process and tracking the implementation of resilience programs. The Company also remains committed to operating these resilience programs efficiently and effectively, particularly by working in tandem with Con Edison, to enhance their affordability.

O&R, jointly with Con Edison, has formed an Environmental Justice Working Group (EJWG) and plans to release a corporate policy statement to apply an equity lens to its operations and programs. O&R will consider these principles going forward as we learn more about the impact our investments have on DACs through our reporting. Key components of the policy statement will include:

- O&R will work to actively reduce or address any disproportionate burdens of operations on DACs;
- O&R will work to understand DAC concerns;
- Clean energy investments will benefit DACs;
- O&R will provide opportunities for employment in their clean energy future.

The EJWG's principles are encompassed within subcommittees that are responsible for setting and achieving these objectives. One objective is to focus on working with operational groups to develop assessment and prioritization methodologies that benefit DACs in all work planning as well as developing Key Performance Indicators and internal project scoring. Another objective is to educate company employees on environmental justice and the foundations of the New York State Climate Leadership and Community Protection Act (CLCPA), which will allow more consideration of DACs across the corporate spectrum. In addition, the company will advance meaningful agreement between environmental justice stakeholders and company leadership which will expand efforts to recruit and train residents of DACs as well as obtain federal funding for projects within these areas. Lastly, the EJWG will be responsible for supporting and advising on the development of the company's reporting efforts as the Company makes investments in these communities.

O&R is committed to two ways to report investments in DACs to learn how our programs and projects will impact these communities, facilitate the phasing of resilience infrastructure investments, and steer investments towards projects that continue to benefit disadvantaged communities. The first way is to report the dollar value of the resilience investments in this Plan that benefit DACs, through biennial retroactive reporting using the New York State DAC map (see Figure 4). The second is to track the number of outages in DACs relative to non-DACs.

Furthermore, for the selective undergrounding program, O&R will use the project prioritization framework described in the next section.

These actions help to balance broader infrastructure needs with focused DAC resilience enhancements and align with the CLCPA. These measures will also support continuous learning from the Company's approach and engagement with stakeholders within these communities to assist proactive project prioritization that includes DAC considerations in initial project selection.

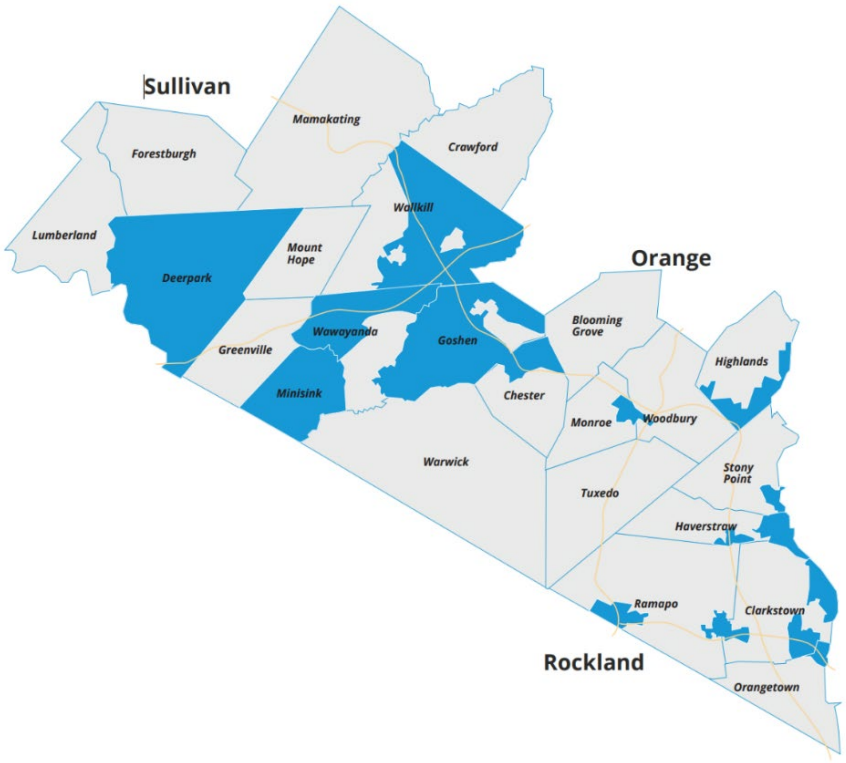


Figure 4. Disadvantaged communities in the O&R service territory, indicated in blue.[19]

Project Prioritization Framework

Many of the investments in this plan are of a programmatic nature, and therefore the phasing of implementation based on location has yet to be defined. To consider equity into the implementation of the Plan, O&R has developed a general project prioritization framework that will be used to sequence the phasing of specific infrastructure investments and guide investments to projects that benefit DACs. The framework draws inspiration from the Undergrounding Pilot Program Screening Criteria included in Con Edison's 2022 Rate Case, which has received stakeholder support. The Company recognizes the framework is general at

this point and that it ought to be modified as needed for different programs, as specific schemes may have different or additional screening criteria.

The three screening criteria included in the project prioritization framework below will be used in a step-by-step manner, starting with criterion one.

1. **Identify where investments will avoid the largest number of outages.** O&R will prioritize assets that have been identified by our engineers and planners as being vulnerable by 2050, as well as assets that have a history of recurring outage events. Investing in these vulnerable assets first will reduce the overall number of outages for the system by replacing older or damaged equipment and those projected to be exposed in the near term with more resilient equipment. This is a critical first step of risk minimization that increases system resiliency for the Company's most vulnerable assets.

2. **Identify where investments would have the greatest impact for critical customers (*e.g.*, hospitals, fire stations, emergency facilities).** By prioritizing investments that will enable these customers to keep receiving service during an extreme weather event, the community will be better able to weather the storm.

3. **Identify disadvantaged communities from the NY State DAC Map.** Once criteria 1 and 2 have been considered and specific assets have been identified, then the assets that also serve disadvantaged communities, as identified in the NYS DAC Map, will be prioritized for investment. Investing in these assets will benefit DACs by strengthening their electric system. DACs are the most likely to be negatively impacted by an outage, therefore it is important that these communities are prioritized and invested in.

Investment Plan

This section summarizes the resilience investments that O&R plans to make to safeguard the electric system against the immediate and longer-term risks of climate change. These investments follow the resilience management framework described earlier and were developed through the process described below.

First, the Company reviewed the high and moderate risks identified in the CCVS to agree on the most pressing risks that O&R needs to address in the next 5-20 years. This included considering the degree to which those risks would already be mitigated through investments committed to in O&R's most recent rate case[20] and through the commitments to integrate climate change considerations into existing planning, design, and operations practices, as previously described (*e.g.*, integration of increasing temperatures into load forecasting). The resulting set of priority risks (based on potential impacts to the electric system and the resultant impacts to customers) includes:

- Flooding and erosion impacts at specific substations and across the O&R transmission and distribution system;
- Wind and ice impacts on the Company's overhead transmission and distribution systems; and
- Emergency response and overall preparedness for extreme weather events.

O&R worked to develop the set of preferred adaptation strategies for each priority risk by:

- Working through the resilience management framework to consider flexible solutions that help the Company prevent, mitigate, and respond to climate change impacts through a mix of traditional and new solutions;
- Mapping the potential adaptation measures included in the CCVS to the priority risks and hosting additional discussions in order to address holistically the set of potential solutions;

- Narrowing the set of potential solutions by considering factors such as technical feasibility, cost effectiveness, and potential co-benefits; and
- Considering how the solutions worked together to safeguard the electric system and minimize risk.

O&R has selected 13 projects/programs for inclusion in the CCRP. The proposed projects and programs, along with the timing of implementation, are set forth below, with specific justifications for each investment detailed in the subsections below. The details of each of these projects/programs are set forth in the white papers included in Appendix 5: Project and Program Details to this Plan.

The resulting package of proposed investments was reviewed by company leadership and the CRWG. To implement these programs, O&R expects to invest approximately $411 million over the first 5 years (2025–2029) of the resilience plan. A year-by-year breakdown is shown in Figure 5. Over the following 15 years (2030 through 2044), these resilience programs and projects will cost approximately an additional $1.1 billion.

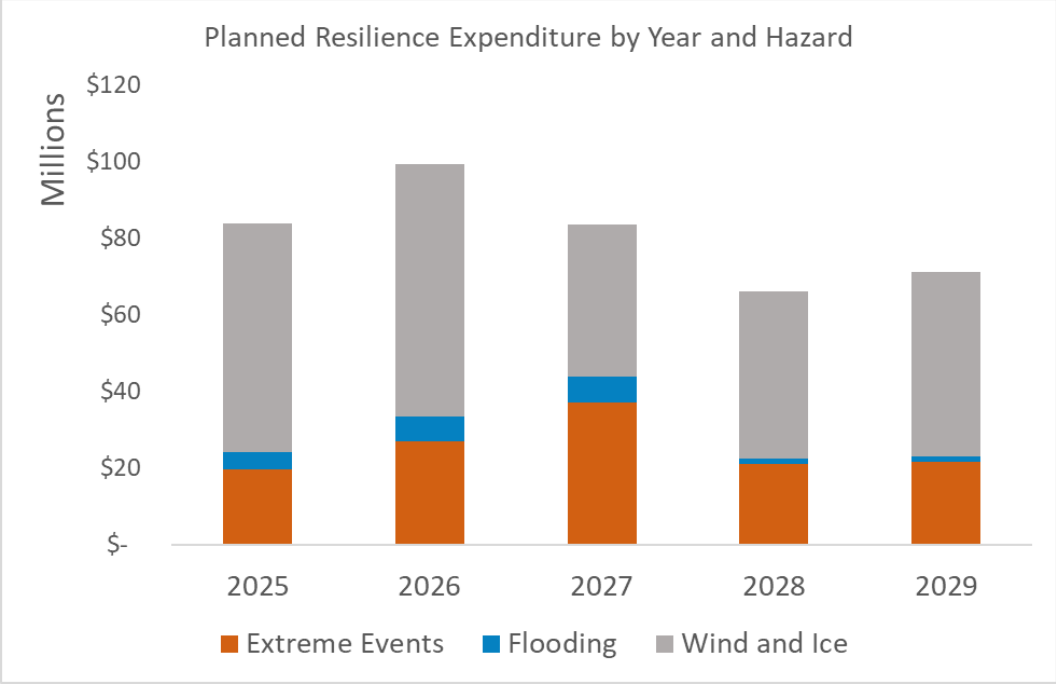


Figure 5. Planned resilience expenditures by year and hazard

Based on estimated in-service dates for the projects, the Company estimates those investments would result in an approximate revenue requirement of $165 million over that same period. This level of capital expenditure over the five years (2025-2029) would have a varying delivery and total bill impact from 2% to 11.5%, and 1.2% to 7.5% for customers, respectively. See Table 8 for a year by year breakdown.

	CCRP Revenue Requirement[ix] ($000)	Delivery (% change)	Total Bill (% change)
2025	$8,200	2.2%	1.3%
2026	$18,680	4.9%	2.9%
2027	$35,050	8.8%	5.4%
2028	$47,340	10.9%	6.9%
2029	$55,750	11.6%	7.6%

Table 8. Estimated revenue requirement and total bill impact by year

In this Plan, the Company is required to provide the NYSPSC with the estimated costs and benefits of these projects/programs to both the Company and its customers. For each program or project included in this Plan, the Company provides detailed cost estimates for the first five years (2025-2029) as well as forecast through 2044. In addition, the Company provides a description of the customer benefits in terms of overall resiliency, outage prevention, or quicker outage restoration times, as applicable. The Company also provides the five-year rate impact for this Plan.

As the Joint Utilities explained in their comments filed on August 22, 2022, in Case 22-E-0222, "there currently is no widely recognized and accepted methodology for comparing resiliency investments to customer and regional avoided costs."[21] The Company has provided both financial and non-financial benefits for the investments in the CCRP because there still is no widely recognized and accepted methodology. Therefore, the specific cost savings to customers cannot currently be provided and non-financial benefits may overlap with financial benefits. The Company will work with the NYSPSC and DPS Staff to further review an appropriate customer benefit methodology. This is still true today. The Company will work with the NYSPSC and DPS Staff to consider and discuss appropriate methodologies for evaluating resilience investments.

In addition to the cost information, each program description contains a schedule of planned expenditures and implementation for the first five years of this Plan and forecasted expenditures with increases based on similar scope and inflation through 2044. Because the

[ix] The Revenue Requirement is the sum of all costs incurred to the customers during a period of time; for the purposes of bill impacts, this is on an annual basis. This requirement is for the resilience driven investments introduced in this CCRP.

new law requires the Company to file a new CCRP every five years, the Company will provide similar detail in that filing for the next five years of its resilience plan.

O&R's CCRP is a comprehensive and cohesive long-term plan for mitigating climate change impacts, reducing restoration timeframes and related costs, and enhancing resilience as required by the law. Because the CCRP is the Company's full plan, reductions or changes to individual components of the CCRP can impact the overall effectiveness of the Company's resilience efforts. Therefore, the Company requests that the Commission fully authorize the funding levels and the programs in the CCRP.

Program	Hazard	Strategy	2025-2029	2030-2034	2035-2044
Hillburn 138kV Substation Flood Protection Project	Flooding	Prevent	$500,000	$ -	$75,000,000
Summitville 34.5kV Substation Flood Protection	Flooding	Prevent	$140,000	$ -	$ -
Lovett 138kV Substation Flood Mitigation Project	Flooding	Mitigate	$13,200,000	$ -	$ -
Shoreline Erosion Protection	Flooding	Prevent	$6,330,000	$7,210,000	$15,250,000
Transmission Overhead Structure Replacement Program	Wind and Ice	Prevent	$20,140,000	$32,040,000	$67,760,000
Enhanced Overhead Program	Wind and Ice	Prevent	$90,970,000	$70,390,000	$148,870,000
Hazard Tree Removal Program	Wind and Ice	Prevent	$8,540,000	$15,220,000	$32,180,000
Selective Undergrounding	Wind and Ice	Prevent	$143,880,000	$117,480,000	$248,460,000
Micronet Weather Station Expansion	Extreme Events	Respond	$790,000	$570,000	$1,200,000

NY Accelerated Smart Grid Distribution Automation Program	Extreme Events	Mitigate	$60,620,000	$13,450,000	$25,100,000
Emergency Response Operations and Control Facility	Extreme Events	Respond	$15,630,000	$5,580,000	$11,810,000
Storm Material Management	Extreme Events	Respond	$37,590,000	$7,910,000	$16,720,000
Con Edison and O&R Storm Resilience Center	Extreme Events	Respond	$12,980,000	$1,080,000	$2,280,000

Table 9. Summary of Planned Investments

The Company recognizes that the investments needed to prepare and protect customers from climate change have an impact on customer rates and affordability. Historically, the Company has addressed equity concerns primarily through its low-income assistance and affordability programs which are reviewed in its base rate cases. In the Company's most recent base rate cases,[22] the NYSPSC concluded that the Company's electric and gas low-income assistance and affordability programs were consistent with the NYSPSC's Energy Affordability Policy (EAP). The NYSPSC also noted that the Company continues to provide funding for payment assistance to those O&R customers who have difficulty paying their utility bills in a timely fashion due to financial circumstances. EAP discounts are reset each year to account for changes in the Company's rates, so participating customers are, in effect, protected against some of the impacts of increased rates. The Company has implemented outreach and education regarding bill assistance and payment plan opportunities for all customers and coordinates with social service agencies to apply public assistance funding directly to customer accounts. The Company participates in an EAP Working Group led by DPS Staff to discuss statewide efforts to improve and expand the EAP program. The Company will continue to work with stakeholders on these and other customer affordability programs. In addition, the Company continues to waive its reconnection fee for any customer enrolled in the Company's Low-Income Program. The Company will revisit these low-income assistance and affordability programs in its upcoming base rate case filing.

The following sections describe each program/project in more detail, including approximate cost, timeline, outcomes, and methods.

Flooding

Rising sea levels in the Hudson River, extreme storms, and increasingly intense precipitation pose inland and riverine flooding risks to O&R's electric system.[x] Precipitation projections show that heavy precipitation in the O&R service territory could increase throughout the century, as noted in the CCVS. The CCVS also indicates that substations are highly vulnerable to flooding. Specifically, projections show that the days with precipitation exceeding 2 inches could increase 45% (5 days) and 77% (6 days) by 2050 and 2080, respectively, at Dobbs Ferry, relative to a baseline of 3 days. This is a relevant threshold for urban flooding and flash flooding after drainage systems are overwhelmed. Additionally, climate change may lead to more intense hurricanes in the North Atlantic, increasing maximum sustained wind speeds by approximately 5%, and rainfall amounts by approximately 10% to 15% relative to historical hurricanes. More intense storms bring stronger hurricane winds, storm surge, and rainfall. The increase in heavy precipitation events, along with rising sea levels and more frequent coastal storms have potential repercussions to the Company's infrastructure and operations, which include:

- **Equipment damage:** Exposure to flood water can damage electric components, leading to increased repair costs and longer outages. Spare parts may also become limited.
- **Equipment corrosion:** Saltwater from rising sea levels or winter road runoff corrodes electronic components, introducing longer-term risks for asset failures and outages.
- **Soil weakening:** Water exposure weakens equipment foundations, increasing risk due to erosion near riverbanks and coasts, which may require intervention.
- **Limited accessibility:** Flooding and high tides make it difficult for maintenance and repair crews to access key assets, delaying timely service restoration during or after storms.

To address these risks, O&R has developed the following projects and program:

- **Hillburn 138 kV Substation Flood Protection Project**. Address flood risks, enhance the protection of essential infrastructure, and maintain service continuity for the communities this substation serves.
- **Summitville 34.5kV Substation Flood Protection Project**. Address flood risks, enhance the protection of essential infrastructure, and maintain service continuity for the communities this substation serves.

[x] Hereafter, "flooding" will refer to any hazard which causes a flood, including sea level rise, precipitation, extreme storms, or others.

- **Lovett 138kV Substation Flood Mitigation Project**. Address flood risks, enhance the protection of essential infrastructure, and maintain service continuity for the communities this substation.
- **Shoreline Erosion Protection Program**. Protect shorelines from erosion and establish more robust erosion monitoring efforts to protect shoreline infrastructure.

Collectively, these projects and program will serve to better protect O&R's electrical infrastructure from flood risks, reduce the associated costs of these risks, and maintain service reliability during and after flood events.

Prevent

Hillburn 138kV Substation Flood Protection Project

Primary Hazard Addressed: Flooding

Project Description

O&R will adopt a phased approach to flooding risk mitigation that coordinates with the Company's other planned investments at the Hillburn substation. Initial efforts will focus on immediate, cost-effective solutions to address the most pressing flood vulnerabilities. In the first five-year plan, O&R will prioritize the installation of a perimeter berm, which is a raised barrier or embankment designed to prevent or control the flow of water. In the medium-term (2029-2032), upgrades are scheduled for the Hillburn substation to increase capacity. The plan includes two new transformers, new switchgear, and control building modifications. This work will utilize O&R's new Climate Change Planning and Design Guideline to incorporate climate change considerations into the design, including but not limited to: elevating the new equipment, waterproofing cabinets, and increasing the site grade for new equipment. These upgrades, including the incorporation of the new design standards, will be addressed in a future rate case, rather than being requested in this filing.

The Hillburn substation is located within a DAC and serves approximately 3,103 customers, including 20 critical facilities, such as nursing homes and emergency services. This project will provide non-financial benefits by facilitating O&R's ability to provide safe and reliable service to these communities and critical facilities. Planned mitigation measures as part of this project are designed to prevent equipment damage and failure associated with flooding events. This approach will contribute to more reliable service during and after extreme weather conditions, such as the July 2023 heavy rainfall event. By proactively addressing the potential for flooding, this project will provide financial benefits by allowing O&R to avoid costs and time associated with restoring or replacing compromised equipment. Post-event restoration can be more focused, quicker, and less costly.

Climate Change Justification

The Hillburn substation's location within the current FEMA 500-year floodplain, combined with the escalating frequency of heavy precipitation and flood events due to climate change, puts it at risk of flooding from stream/river overflow from the Ramapo River during extreme rainfall events. The substation location is surrounded by the 500-year floodplain and directly adjacent to the current 100-year floodplain.

Projected flood inundation depths range from less than 1 foot to 2-3 feet, due to the varying ground elevation of the substation. Notably, floodplain extents indicate that it is possible for the site surrounding the substation to flood even if the station itself remains dry, which could represent a critical access issue. Climate change may lead to more intense hurricanes in the North Atlantic, increasing maximum sustained wind speeds by approximately 5%, and rainfall amounts by approximately 10% to 15% relative to historical hurricanes. More intense storms bring stronger hurricane winds, storm surge, and rainfall. If flood waters were to inundate the site during a flood, the substation equipment could experience sudden failure. Flooding impacts can be severe enough to disable equipment and lead to circuit failures, which can affect system reliability and life expectancy of the assets. Climate change further exacerbates flood hazards at the site; state guidance recommends assuming a 20% increase in future 100-year flows based on climate data.[23] Failures not only threaten the life expectancy of equipment but also can lead to prolonged system outages. The combination of climate-induced flood hazards and limitations of existing equipment to survive flooding could compromise the operational integrity of the Hillburn substation, with financial burdens and outage implications for the communities it serves.

Funding Request

2025-2029	2030-2034	2035-2044
$500,000	$0	$75,000,000

Long-Term Roadmap

O&R is in the preliminary planning phase for the replacement of the 138kV substation. The rebuilt station will be in a nearby location outside the floodplain.

Prevent

Summitville 34.5kV Substation Flood Protection Project

Primary Hazard Addressed: Flooding

Project Description

The Summitville substation serves approximately 683 customers, including 2 critical facilities, such as emergency services. This project will provide non-

financial benefits by facilitating O&R's ability to provide safe and reliable service to these communities and critical facilities. Planned mitigation measures as part of this project are designed to prevent equipment damage and failure associated with flood events. Lowering the risk of flood damage and related equipment failures will reduce customer outages, allowing for more consistent power delivery during and after extreme weather events. By proactively addressing the potential for flooding, this project will provide financial benefits by allowing O&R to avoid costs and time associated with restoring or replacing compromised equipment. Post-event restoration can be more focused, quicker, and less costly.

To increase flood resilience at the Summitville substation, O&R will install a paved perimeter berm, standing at a maximum height of 2.5 feet. This berm will serve as the first line of defense, designed to divert potential floodwaters away from the substation's core infrastructure until 2032.

Climate Change Justification

The Summitville substation's location within the FEMA 100-year floodplain, coupled with the increasing intensity of precipitation events due to climate change, places it at risk of flooding from stream/river overflow from the Delaware and Hudson Canal during extreme rainfall events. Projected flood depths during the 100-year storm scenario range from 0.03 ft to 2.2 ft. Substation equipment is typically not designed to come into contact with water and can experience sudden failure if exposed. As the substation approaches its planned retirement in 2032, the cumulative risk of experiencing multiple flooding events amplifies the potential for damage. Flooding impacts can be severe enough to disable equipment and lead to circuit failures, which can affect system reliability and life expectancy of the assets. Climate change further intensifies flood hazards at the Summitville site; state guidance recommends assuming a 20% increase in future 100-year flows based on climate data. Failures not only jeopardize the lifespan of the equipment but also can result in extended system outages. The conjunction of climate-driven flood risks and the constraints of the current equipment could undermine the operational efficiency of the Summitville substation, leading to financial implications and service disruptions for the communities it serves.

Funding Request

2025-2029	2030-2034	2035-2044
$140,000	$0	$0

Long-Term Roadmap

By 2032, the Summitville substation is set to be retired and replaced with the new Wurtsboro substation.

Lovett 138kV Substation Flood Mitigation Project

Mitigate

Primary Hazard Addressed: Flooding

Project Description

The Lovett substation is situated within the Hudson River's 100-year floodplain and is vulnerable to the threat of river overflow during extreme rainfall events and impacts of rising sea levels. The substation serves approximately 53,915 customers, including 489 critical facilities such as hospitals and emergency services. Planned mitigation measures as part of this project are designed to reduce outage durations in the event of a flood.

In the short-term, O&R's strategy includes two primary flood protection measures: installing a control house at higher elevation and installing waterproof cabinets. The new control house is a significant investment that includes rewiring the station and connected equipment at higher elevation. This strategic elevation will safeguard a crucial component of the substation from the majority of potential flood events. Meanwhile, installing waterproof cabinets offers protection for essential electrical components that cannot be elevated. Waterproof cabinets offer an extra layer of protection for when floodwaters breach other barriers, helping maintain functionality for the most vital parts of the substation.

This flood mitigation strategy will not prevent all flood damage and potential outages at the station. However, it will make recovery faster in the event of a flood. The control house components are vital for the substation to function and can take a significant amount of time to repair/replace in the event of a flood. Protecting these components will allow O&R to re-energize the station once the flood water recedes and other equipment dries, resulting in shorter outage durations. These actions are expected to provide sufficient risk reduction in the near term.

Climate Change Justification

The Lovett substation's location within the Hudson River FEMA 100-year floodplain, coupled with the increasing intensity of precipitation events due to climate change, places it at risk of flooding from stream/river overflow. Projections indicate that sea level for New York State could rise by 9 inches by the 2030s and 16 inches by the 2050s, intensifying riverine flooding events that may affect the Lovett site. Projected flood depths during the 100-year storm scenario plus sea level rise range from 3.5 ft by 2030 to 5.2 ft by 2080. Substation equipment is typically not designed to come into contact with water and can experience sudden failure if exposed. Saline exposure from storm surge events can cause corrosion to the equipment and decrease the asset health and lifespan. As sea levels rise in the Hudson River, flooding projections at the Lovett station become more severe. As the substation approaches its planned retirement in 2039, the cumulative risk of experiencing multiple flooding events amplifies the potential for damage.

Flooding impacts can be severe enough to disable equipment and lead to circuit failures, which can affect system reliability and life expectancy of the assets. Climate change further intensifies flood hazards at the site; state guidance recommends assuming a 20% increase in future 100-year flows based on climate data. Failures not only jeopardize the lifespan of the equipment but can also result in extended system outages. The conjunction of climate-driven flood risks and the constraints of the current equipment could undermine the operational efficiency of the Lovett substation, leading to financial implications and service disruptions for the communities it serves.

Funding Request

2025-2029	2030-2034	2035-2044
$13,200,000	$0	$75,000,000

Long-Term Roadmap

In the long term, the Lovett substation will be rebuilt at another site outside of the floodplain.

Prevent

Shoreline Erosion Protection Program

Primary Hazard Addressed: Flooding

Program Description

The Shoreline Erosion Protection Program will include projects to protect shorelines from erosion and to establish more robust erosion monitoring efforts, thereby protecting shoreline infrastructure. By safeguarding this infrastructure, this program will provide financial benefits by avoiding the need to repair or replace assets adversely affected by shoreline erosion. This program will provide non-financial benefits by facilitating O&R's ability to provide safe and resilient service. Currently, O&R has a 5-year rotating inspection program to identify and prioritize areas with erosion and then implement or plan future mitigation measures. At this point, O&R has successfully eliminated the backlog of implementing shoreline erosion prevention measures and through this program will transition to a more proactive approach.

O&R is proposing to implement proactive armoring measures to help prevent erosion. An example measure is installation of riprap (large rocks along the shoreline). O&R will complement this approach by expanding the inspection range and frequency to reflect climate change. O&R will expand to include all structures within the 100-year floodplain plus 7 feet. Climate change will further exacerbate flood hazards at these sites. New York State guidance recommends assuming a 20% increase in future 100-year flows based on climate data. O&R also plans to

implement new technological improvements to aid in the erosion inspection as they become available.

Climate Change Justification

Without proactive measures to protect and monitor vulnerable shorelines, O&R's infrastructure adjacent to these areas remains at heightened risk due to the intensifying impacts of flooding hazards under climate change. The CCVS indicates that transmission systems have moderate vulnerability to flooding. Sea-level rise will result in heightened and more permanent flooding along the banks of the Hudson River, which will contribute to increased shoreline erosion. Projections indicate that sea level for New York State could rise by 9 inches by the 2030s and 16 inches by the 2050s. Additionally, projected increased frequency and intensity of severe coastal storms will result in deeper and more extensive flooding along shorelines, especially when coupled with sea-level rise. Days with precipitation exceeding 2 inches could increase 45% (5 days) and 77% (6 days) by 2050 and 2080, respectively, at Dobbs Ferry, relative to a baseline of 3 days. Climate change may lead to more intense hurricanes in the North Atlantic, increasing maximum sustained wind speeds by approximately 5%, and rainfall amounts by approximately 10% to 15% relative to historical hurricanes. The combined effects of sea-level rise and storm surge can permanently shift riverbanks inland and result in added inundation of O&R assets. Absent adaptation, erosion can lead to infrastructure damage or even failure, causing power disruptions and reducing system reliability. No action could also result in more frequent and extensive repair needs, outages, and escalating operational costs.

Funding Request

2025-2029	2030-2034	2035-2044
$6,330,000	$6,200,000	$15,400,000

Long-Term Roadmap

O&R expects to continue this program indefinitely at a similar level of effort as 2025-2029.

Wind and Ice

O&R's service area is likely to experience higher wind gusts in the future, and there remains the potential for severe radial icing events. As noted in the CCVS, winds are projected to become more intense, with higher wind speeds in the future largely due to more intense storms. Overhead distribution systems are rated as highly vulnerable to wind and ice hazards in the CCVS. Additionally, there is potential for increased freezing rain frequency and ice accumulation in the region, despite warming trends. This increase in wind speeds and icing events necessitates action. The potential repercussions of wind and ice in the Company's infrastructure and operations include:

- **Line impacts:** O&R's electric system is built to withstand defined design tolerances for combined ice and wind loading, consistent with the National Electric Safety Code (NESC). Wind or ice loading that exceeds these standards can result in asset failure, resulting in outages.
- **Vegetation impacts:** Strong winds and ice accumulation can cause trees and tree limbs to fall on overhead lines and other equipment, causing customers to lose service.

To address these risks, O&R's resiliency investment plan includes the following programs:

- **Transmission Overhead Structure Replacement Program.** Aims to enhance O&R's transmission structures by fortifying its own transmission assets, reducing maintenance costs and minimizing unplanned repair expenditures, while also delivering tangible benefits to customers.
- **Enhanced Overhead Program.** This program aims to decrease outages in the distribution system by strengthening overhead lines, reducing the risk of line failure due to tree contact.
- **Hazard Tree Removal Program Expansion.** This program aims to decrease power outages and restoration costs and increase public safety by removing impacted ash trees and other hazard trees.
- **Selective Undergrounding Program.** This program aims to enhance the durability and reliability of O&R's distribution and transmission systems by relocating overhead electrical lines and equipment below ground.

Prevent

Transmission Overhead Structure Replacement Program

Primary Hazard Addressed: Wind and Ice

Program Description

The Overhead Transmission Structure Replacement Program is a successful ongoing program aimed at replacing O&R's transmission overhead structures with more resilient structures. This program will accelerate the existing program to prepare for increased risk from climate change.

As part of this program, O&R will expand from an inspection-based structure replacement strategy to a more proactive approach that does not solely rely on inspections. O&R also will consider the climate change vulnerability of aging structures and will move to proactively replace them. For example, O&R has already identified one transmission line that is being impacted by changing environmental conditions along the Ramapo River where the ground is shifting/sinking and thus may be more susceptible to wind and ice impacts. O&R is proposing to ramp up the pace of structure replacement, as well as the variable accessibility for the transmission rights of way across the O&R service territory. O&R expects to replace both steel structures and wood poles incrementally, and the cost will vary based upon the level of difficulty of access to the site.

The urgency of this program is underscored by the dual challenges of aging infrastructure and the escalating threats posed by climate change, particularly the increasing frequency and severity of major storms. By investing in the overhead structure replacement program, O&R not only fortifies its own transmission assets, reducing maintenance costs and minimizing unplanned repair expenditures, but also delivers tangible benefits to its customers. More resilient infrastructure means fewer service interruptions and an overall enhanced customer experience. It will also result in reduced risk of pole collapse and result in fewer on-site repairs, which will lessen potential safety hazards to both the public and O&R's employees and contractors.

This program will provide non-financial benefits by improving safety for both the public and Company employees and contractors and supporting a more reliable power delivery system for the communities O&R serves. In addition, a resilient transmission system is integral to New York State's efforts to transition from fossil fuel generation and achieve greenhouse gas (GHG) emission reduction goals. Interruptions or outages in the transmission system result in fewer pathways for the renewable generation to reach customers, including DACs.

Climate Change Justification

Relying solely on the current state of O&R's overhead transmission structures, without upgrades or an acceleration to the current replacement pace, may expose aging structures to intensifying climate risks, especially with many of these structures being of wood construction. The CCVS

identified transmission structures as moderately vulnerable to wind and ice hazards. Ice accumulation on transmission towers and lines can result in transmission line failure. The risk intensifies when ice accumulation is accompanied by heavy winds. Climate projections indicate that more intense and stronger wind gusts in the O&R service territory are possible. Projections indicate an increase in freezing rain frequency and ice thickness in New York with greater ice accumulation on vertical surfaces due to enhanced surface wind speeds during cold seasons, which could have implications for overhead structures. Even in the absence of ice, aging existing structures will be more susceptible to damage during extreme weather events such as hurricanes and thunderstorms, which also may increase in severity and frequency, illustrated by recent storms such as Hurricane Ida and Superstorm Sandy. Such vulnerabilities can lead to equipment failures, resulting in power disruptions and potentially compromising both the reliability and lifespan of the assets. Specifically, inaction could lead to increased restoration costs and more extended system outages, impacting the communities O&R serves and placing additional financial and operational burdens on the Company.

Funding Request

2025-2029	2030-2034	2035-2044
$20,140,000	$33,000,000	$82,000,000

Long-Term Roadmap

O&R expects to continue this program through at least 2044 at a similar rate.

Prevent

Enhanced Overhead Program

Primary Hazard Addressed: Wind and Ice

Program Description

Over the past several years, O&R has been enhancing its overhead distribution system by deploying a highly reliable, compact overhead cable system. Known as spacer cables, this system includes conductors which are covered with two layers of polymer, designed to allow intermittent tree contacts without causing an outage or nuisance tripping. The conductors are also supported by a high strength messenger, which provides mechanical support, serves as a system neutral, and acts as a shield wire against lightning. The compact footprint of the system also allows O&R to reduce tree trimming clearances.

This investment will expand O&R's installation of spacer cables in the overhead distribution system by over 75 miles over the 5-year plan. Within the 5-year plan, O&R has identified 27

specific overhead spacer cable projects to enhance 30 miles of overhead distribution line. In addition, O&R plans to enhance another 45 miles of overhead distribution line.

Spacer cable systems will advance overall system resilience by reinforcing the distribution overhead lines to external environmental hazards, reducing maintenance costs over the long term, thereby providing financial benefits. Moreover, spacer cable provides non-financial benefits by minimizing potential service interruptions caused by climate hazards, thereby producing an overall enhanced customer experience.

Climate Change Justification

Projections indicate that the O&R service territory will experience more intense storms in the future, emphasizing the importance of this program to reduce the number and duration of outages. Strong winds and ice accumulation can cause trees and tree limbs to fall, which can lead to contact with electric equipment, lines, and structures, potentially resulting in widespread outages and the cable system investments proposed decrease the Company's risk of those such outages occurring. Emergency response times may also be delayed if access to assets is hindered by downed trees from heavy precipitation, wind, and other extreme events. Spacer cables provide tensile strength to cable systems that can hold the weight of a downed tree thereby avoiding customer outages.

Severe rain events can cause soft soil conditions which can increase likelihood of trees to fall down. Projections show that the number of days per year with more than 2 inches of rain could increase by 45% by 2050 and 77% by 2080 at Dobbs Ferry. O&R is also likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future and the potential exists for increased radial icing intensity. Furthermore, North Atlantic hurricanes are projected to become more intense (~5% increase) and have higher rainfall amounts (~10%-15% increase) relative to historical hurricanes. Projections indicate an increase in freezing rain frequency and ice thickness in New York with greater ice accumulation on vertical surfaces due to enhanced surface wind speeds during cold seasons Thus, it is essential to implement these storm hardening practices to improve the resiliency of the O&R system.

Funding Request

2025-2029	2030-2034	2035-2044
$90,970,000	$72,400,000	$181,300,000

Long-Term Roadmap

O&R expects to continue this program at a similar rate through at least 2044.

Hazard Tree Removal Program Expansion

Prevent

Primary Hazard Addressed: Wind and Ice

Program Description

Tree contact with distribution lines is a primary cause of storm related outages for O&R. In the past, ice storms and strong winds have caused widespread tree and power line damage in the O&R service territory. After the Reilly and Quinn storms of early 2018, O&R implemented additional and targeted storm hardening practices, including a dedicated hazard tree removal program. Severe thunderstorms in July 2023 that caused numerous power outages in the O&R service territory due to damaging lightning, heavy rainfall, and downed trees, emphasized the importance of continuing and enhancing these practices. The Company is now proposing to increase the number of hazard trees removed annually by an additional 500 trees per year through 2029.

A hazard tree is a tree that has a structural defect or other issue that makes it likely to fall and damage lines. The specific focus of the Company's Hazard Tree Removal Program is a concentrated effort to remove ash trees devastated by the impacts of the invasive Emerald Ash Borer.[xi] Since the beginning of the Hazard Tree Removal Program in 2018, O&R has removed approximately 7,200 hazard trees, (70% of which have been ash trees). This project will provide financial benefits by avoiding the need to repair or replace Company assets damaged by hazard trees. This project will also provide non-financial benefits by improving public safety and supporting a more reliable power delivery system for the communities O&R serves.

While it is difficult to quantify the direct resiliency or reliability improvement from a single tree removal, the amount of time and resources required for distribution segment restoration after a tree fall is significantly more than the cost of removing the tree prior to failure. As the frequency and intensity of severe storms increase, there is a higher likelihood of trees falling on distribution lines and causing sustained outages. Trees often cause damage to the infrastructure that takes longer to repair than some other outage causes. As a result, the system and customer outage durations are likely to increase.

Climate Change Justification

As described, O&R has already seen impacts from historical ice storms, strong winds and severe thunderstorms. Projections indicate that the O&R service territory will face more intense storms in the future, emphasizing the importance of this program to reduce the number and duration of outages. Strong winds and ice accumulation can cause trees and tree limbs (especially as it

[xi] The Emerald Ash Borer is a beetle native to east Asia which has become widespread in the eastern US. The beetles nest in and eat ash trees, damaging them and causing the trees to die. The trees are then more likely to fall.

relates to those trees that have a compromised health) to fall, which can lead to contact with electric equipment, lines, and structures, potentially resulting in widespread outages, especially if poles are older or have existing damage. Emergency response times may also be delayed if access to assets are hindered by downed trees from heavy precipitation, wind, and other extreme events.

Projections show that the number of days per year with more than 2 inches of rain could increase by 45% by 2050 and 77% by 2080 at Dobbs Ferry. Intense rain events can cause soil to become saturated, increasing the risk of trees falling. O&R is also likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future and the potential exists for increased radial icing intensity. Furthermore, North Atlantic hurricanes are projected to become more intense (~5% increase) and have higher rainfall amounts (~10%-15% increase) relative to historical hurricanes. For those reasons, it is essential that the Company accelerate the removal of hazard trees to prevent these already compromised trees of causing outages.

Funding Request

2025-2029	2030-2034	2035-2044
$8,540,000	$15,000,000	$37,000,000

Long-Term Roadmap

O&R expects to continue this program at a similar rate through at least 2044.

Prevent

Selective Undergrounding Program

Primary Hazards Addressed: Wind and Ice

Program Description

The Selective Undergrounding Program is aimed at enhancing the durability and reliability of O&R's system by undergrounding specific lines. This is a continuation of O&R's successful undergrounding efforts. Undergrounding refers to relocating overhead electrical lines and equipment below ground, reducing their exposure to an array of external and extreme hazards. By investing in this program that will underground over 30 miles of distribution and 5.5 miles of transmission lines, the Company will avoid the need to repair or replace Company assets damaged by climate hazards. This program will provide non-financial benefits by improving public safety (reduces risks from fallen lines during storms), and supporting a more reliable power delivery system for the communities O&R serves, specifically with many of the undergrounding projects serving DACs.

Within the 5-year plan, O&R has identified 19 specific distribution line undergrounding projects. In addition, O&R plans to underground another 13 miles of overhead distribution line. Furthermore, O&R has identified transmission line 705 in Clarkstown for undergrounding.

Undergrounding enhances system reliability, particularly during storm events, as it significantly minimizes outages caused by elements such as fallen branches and high winds, which can damage and lead to infrastructure failure and power outages. The surrounding soil also provides thermal insulation to underground equipment and lines, reducing the assets' exposure to extreme heat and cold events (including polar vortex events). Ultimately, undergrounding will advance overall system resilience by mitigating exposure to external environmental hazards, reducing maintenance costs over the long-term, and minimizing potential service interruptions caused by climate hazards. In addition to reducing customer outages during extreme events, undergrounding also improves reliability during normal operating conditions by reducing risk from other sources, such as wildlife contact and car accidents.

Climate Change Justification

The CCVS indicates a projected increase in the frequency of intense storms and extreme events in the O&R service territory, presenting risk to overhead distribution systems. The increased frequency and intensity of extreme weather events will cause more frequent contacts between distribution lines and vegetation or debris.

The O&R electric system includes over 500 miles of electric transmission lines and almost 4,000 miles of overhead electric distribution lines which are exposed to potential outages and interruptions due to wind and ice events. As a result of climate change, the O&R service territory is likely to experience more frequent and intense wind and ice events, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation. In particular, the O&R service area is likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future. Climate projections from the CCVS indicate that warming atmospheric and ocean surface temperatures will likely invigorate hurricanes in the North Atlantic to become more intense (~5% increase, imply stronger hurricane winds) and have higher rainfall amounts (~10% to 15% increase) relative to historical hurricanes. Projections also show that maximum wind gusts could reach 110 mph in the future. Furthermore, despite the high uncertainty, the potential remains for increased freezing rain frequency and ice accumulation in the service area in the future.

Funding Request

2025-2029	2030-2034	2035-2044
$143,880,000	$121,400,000	$304,800,000

Long-Term Roadmap

O&R expects to continue this program at a similar rate through at least 2044.

Extreme Events

Extreme weather events, including concurrent or consecutive extreme events, present unique challenges to operations, planning, and infrastructure across the electric system. These events may take the form of hurricanes, nor'easters, cold snaps and polar vortex events, lightning and thunderstorms, drought, wildfire, or multiple extreme weather events (*e.g.*, ice storm followed by a cold snap). There is high confidence that the probability of coincident extreme events will likely continue to increase in both frequency and intensity in the future. Due to the wide variety of hazard types that may take the form of extreme events, impacts to O&R's infrastructure and operations could be widespread, including infrastructure damage and failure, operational disruptions, and increased risk of prolonged customer outages.

To address these risks, O&R has developed the following programs and projects:

- **Micronet Weather Station Expansion Program.** This program will install seven new weather stations across O&R's service territory, allowing for more granular real-time weather data collection.

- **NY Accelerated Smart Grid Distribution Automation Program.** Aims to improve system resiliency and storm harden the distribution system by accelerating the installation and commissioning of SCADA controlled devices on a feeder-by-feeder basis, along with installing and upgrading field devices with command-and-control schemes.

- **Emergency Response Control Facility.** Aims to increase resilience by increasing O&R's preparedness for storm coordination and response by installing a dedicated emergency storm response control facility.

- **Storm Material Management Program.** This program will allow for the acquisition and storage of storm material and equipment, to be used to expedite recovery from extreme events, especially sequential events.

- **Con Edison and O&R Storm Resilience Center Project:** This state-of-the-art facility aims to drastically reduce outage and recovery times during extreme weather events. The Storm Resiliency Center will serve as a central hub for mutual aid crews, equipment, and coordination. It is specially designed to host up to 500 mutual aid crew members and will include space for a variety of storm vehicles and equipment. Key areas of focus include rapid deployment of remote mutual aid (i.e., fly-in mutual aid) resources.

Micronet Weather Station Expansion Program

Respond

Primary Hazard Addressed: Wind and Ice

Program Description

This program will install seven weather stations across O&R's service territory to help fill weather observation/data gaps and provide crucial information on weather and climate. Instrumentation at these stations will function similar to and complement existing Con Edison weather stations throughout New York City and the surrounding area, measuring temperature, wind, precipitation, humidity, and barometric pressure to capture hyperlocal weather conditions within the Company's service territory. The project continues a strategic partnership with the State University of New York (SUNY) at Albany, which supports and contributes to the NYS Mesonet integration of new weather monitoring stations into a state-wide network.

This program will provide financial benefits by facilitating the Company's preparation for major storm events, particularly the staffing for such events. This will serve to reduce the costs of repairing and restoring the O&R electric system. This program will provide non-financial benefits by accelerating restoration times, thereby minimizing potential service interruptions for affected customers. The seven proposed weather stations will be sited on company property in:

- Port Jervis, NY
- Middletown, NY
- Monroe, NY
- Blooming Grove, NY
- Pomona, NY
- Spring Valley, NY
- West Nyack, NY

The proposed weather stations will be used to better understand the effects of climate change at a more granular level and project potential weather impacts across O&R's service territory.

Climate Change Justification

Climate change resilience planning requires a thorough understanding of current and past weather conditions. The weather data received from the proposed weather stations will contribute to reducing restoration and outage costs by providing a more specific understanding of impact, with particular emphasis on wind and ice events. These additional weather stations will greatly enhance existing weather observations across the Lower Hudson Valley region, especially given how weather patterns change significantly on a localized scale due to terrain influences. The weather station data will also inform O&R's understanding of the changing likelihood of coincident and successive extreme events.

Funding Request

2025-2029	2030-2034	2035-2044
$790,000	$580,000	$1,450,000

Long-Term Roadmap

O&R will continue to operate and maintain the weather stations in its service territory. No additional weather stations are expected as of now.

NY Accelerated Smart Grid Distribution Automation Program

Primary Hazard Addressed: Extreme Events

Program Description

Mitigate

Distribution Automation/Smart Grid is a family of technologies, including sensors, processors, and communication networks, that the Company can use to collect, automate, analyze, and optimize data for improving the operational efficiency of O&R's distribution system. To improve system resiliency and harden the distribution system, the Distribution Automation/Smart Grid program will accelerate the installation and commissioning of Supervisory Control and Data Acquisition (SCADA) controlled devices (reclosers, smart capacitors, remotely operated switches, and power quality sensors) on a feeder-by-feeder basis. Paired with the installation of an Advanced Distribution Management System (ADMS), the goal of this program is to be able to identify service interruptions automatically and sectionalize customers into segments of 250 customers or less. This program will also install and upgrade field devices with command-and-control schemes to improve system resiliency and reliability.

Data gathered from SCADA controlled devices provides better visibility of momentary outages in terms of frequency and location, which can be analyzed to direct tree trimming crews more proactively to areas where branches may already be encroaching on lines and have a higher probability of a major storm event resulting in that same branch causing a sustained outage. Distribution automation can provide financial benefits by improving the speed, cost, and accuracy of distribution system processes, as illustrated during past extreme events. For example, during Tropical Storm Ida in September 2021, distribution automation prevented outages to 8,370 customers, remote switching shortened outages for 3,475 customers, 36 truck rolls were saved, and there were 16 safety related switching steps. The benefits of this technology are especially important as the O&R service territory is projected to experience more intense (~5% increase) hurricanes with higher rainfall amounts (~10%-15% increase) in the future. Further the distribution automation program complements the Company's Advanced Distribution Management System (ADMS) which will leverage data from these devices to identify, monitor, and record data from real time system conditions. This will enhance electric

distribution system situational awareness and monitoring and control to improve reliability, resiliency, and efficiency.

The design philosophy of this project follows the three-tiered approach to automating the distribution system set forth below.

1. **Feeder Optimization.** This approach uses smart capacitors, phase balancing and power quality monitoring to establish an efficient system that also supports the reduction of GHG emissions.
2. **Field Automation.** This approach uses recloser auto loop design and auto loop restoration schemes for automatic fault isolation and reduced customer outages and faster restoration times, respectively. Furthermore, MOABs provide customer segmentation to reduce truck rolls and restoration times.
3. **Centralized Automation Control.** The Distribution Control Center and SCADA controlled devices monitor and control customer restoration. SCADA controlled devices also enable automatic system healing of the distribution circuits through the ADMS with Fault Location, Isolation and Service Restoration (FLISR).

This project will help O&R recognize and respond to weather-related system issues and begin to mitigate problems before customers and emergency workers even begin to report them, thereby reducing customer outages and cutting restoration times. This project benefits every customer in the O&R service territory, including DACs.

Furthermore, this program has several non-resilience co-benefits which increases their cost effectiveness, including:

- Increased safety through use of the control room to mitigate dangerous situations caused by downed wires without sending a line crew to the location;
- Improved reliability through auto loop operations and remotely operated switches; and
- Increased customer satisfaction through avoided customer outages, reduced outage duration and improved public safety.

Climate Change Justification

High wind events can lead to structure failure and wind damage to overhead line towers, structures, and downed lines from trees and other debris, leading to outages. Projections show that maximum wind gusts could reach 110 mph in the future. Furthermore, projections show that the frequency of strong storms will likely increase in the future, with higher rainfall amounts, stronger winds, and coastal storm surge. The increased frequency and intensity of

extreme weather events will cause more frequent contacts and/or damage between distribution lines and vegetation or debris. Without the installation of distribution automation devices, those contacts can cause thousands of outages that, particularly during large events that stretch response crews thin, can take days to repair. This is supported by analysis done on the performance of distribution automation devices during storm activity, which showed that thousands of customer outages were avoided and outage times were significantly reduced due to these devices and the control systems used to remotely control them.

The ongoing expansion of this project will continue to storm harden the distribution system, which is critical as the O&R service territory is projected to experience more extreme events and climate hazards as temperatures increase. Without the implementation of distribution automation through this project, the system is at risk of more outages and longer restoration times.

Funding Request

2025-2029	2030-2034	2035-2044
$60,620,000	$13,620,000	$26,580,000

Long-Term Roadmap

After 2029, O&R will continue to replace devices and adopt new technologies, as available. Additionally, the Company will need to update its SCADA system as smart grid technologies evolve in the future.

Respond

Emergency Response Operations and Control Facility

Primary Hazard Addressed: Extreme Events

Project Description

This project will construct a dedicated emergency response control facility on existing land owned by O&R across from the Blooming Grove Operating Center, adjacent to the proposed Storm Material Management Program facility. This position is centrally located within the O&R service territory and has easy highway access for emergency response events, which are projected to increase in frequency and severity based on the latest climate projections.

Having a dedicated space that will be permanently configured as an emergency response control facility will save time while mobilizing in preparation for storm coordination and response. Currently, during emergency response activations, conference rooms and offices are temporarily reconfigured at the existing Blooming Grove Operating Center to prepare for response activation. The new facility will provide necessary office space for emergency planners and

personnel in a location adjacent to where storm equipment is stored. This arrangement is expected to improve overall workflow and communication within and between departments, as well as improve efficiencies in storm preparations.

Climate Change Justification

Extreme events, including hurricanes, snow and ice, cold snaps and polar vortex events, lightning and tornadoes, drought, and wildfire, are projected to increase in intensity in the future. In particular, projections indicate that hurricanes in the service territory will likely become more intense in the future, with higher rainfall amounts relative to historical hurricanes, stronger winds, and coastal storm surge. Furthermore, there is high confidence that the probability of coincident extreme events will likely continue to increase in both frequency and intensity in the future. When extreme events occur concurrently or sequentially to other events, efforts to respond become more difficult, and the impacts can become intensified or cascading.

Furthermore, TV is projected to increase in the future, with consequent impacts on O&R's electric load and operational processes. Projections show that the number of days per year with TV over 85°F in Dobbs Ferry could increase to 8 days by the 2030s and 20 days by the 2050s, compared to the historical baseline of 1 day. Similarly, the number of days per year with TV over 80°F in Dobbs Ferry could increase to 38 days by the 2030s and 60 days by the 2050s, compared to the historical baseline of 11 days.

As extreme weather events, temperature, and humidity increase in the O&R service territory, it will be essential to have a dedicated emergency response control facility, especially in the event of a catastrophic storm or multiple storm events occurring closely in time to one another, which the Company has already seen over the past decade.

Funding Request

2025-2029	2030-2034	2035-2044
$15,630,000	$6,600,000	$16,400,000

Long-Term Roadmap

After the facility is constructed, O&R will continue to operate and maintain it indefinitely.

Storm Material Management Program

Primary Hazard Addressed: Extreme Events

Program Description

Respond

This program will construct a dedicated storm material warehousing facility on existing land owned by O&R across from the Blooming Grove Operating Center. This location is centrally positioned within the O&R service territory and has easy highway access for emergency storm response events, which are projected to increase in frequency and severity based on the latest climate projections.

The storm material warehousing facility will house critical spare equipment. This will include procurement of $5 million in materials for the transmission system and an additional $9 million in materials for the distribution system, for a total of $14 million in material inventory over the first five years. The dedicated storm material warehousing facility will provide financial benefits by allowing the Company to secure critical spare equipment in bulk, in advance, thereby allowing the Company to take advantage of favorable pricing opportunities.

A list of critical spare equipment has been identified based on prior storm events in which specific items were either significantly depleted or not available and therefore were delaying restoration of outages. Maintaining a critical spare list and inventory will provide a non-financial benefit by improving restoration times for customers by having the required equipment on hand to support restoration after for major storm events, thereby reducing outage durations and improving reliability.

Climate Change Justification

The CCVS found that O&R's system is vulnerable to extreme weather events like those that have been experienced in recent history, including hurricanes and tropical cyclones. Projections indicate that hurricanes in the service territory will likely become more intense in the future, with higher rainfall amounts relative to historical hurricanes, stronger winds, and coastal storm surge. Furthermore, there is high confidence that the probability of coincident extreme events will likely continue to increase in both frequency and intensity in the future. When extreme events occur concurrently or sequentially to other events, efforts to respond become more difficult, and the impacts can become intensified or cascading.

As extreme weather events increase in the O&R service territory, it will be essential to maintain critical spare inventory, which will reduce customer outage times. Additionally, current industry supply chain issues are elongating lead times for critical components and delaying shipments of equipment, making it more important that O&R has the necessary level of inventory to respond to storm events, especially in the event of multiple storm events occurring closely in time to one another.

Funding Request

2025-2029	2030-2034	2035-2044
$37,590,000	$29,054,000	$72,730,000

Long-Term Roadmap

Once the facility is constructed, O&R will continue to operate, maintain, and stock the facility indefinitely.

Con Edison and O&R Storm Resilience Center Project

Primary Hazard Addressed: Extreme Events

Project Description

Respond

To reduce outage duration times and costs for customers, the Company is proposing the development of the Con Edison and O&R Storm Resilience Center (the Center), a state-of-the-art facility with industry-leading storm readiness and mutual aid response programs for continued presence before, during, and after storms. The Center will serve as a staging area for fly-in mutual aid crews during recovery from extreme weather events and will serve as the year-round home for bucket trucks that the Companies maintain for fly-in mutual aid crews. The Companies plan to design and construct the facility to house up to 500 fly-in mutual aid crew members. By having the equipment and facility to enable fly-in mutual aid, the Company, together with Con Edison, will be able to expand the pool of available mutual assistance resources and facilitating faster deployment of these resources to reduce restoration times. While the Company is currently leasing a site in Pomona, NY for a similar purpose, the Company may not be able to extend the lease beyond 2026 and the site is not large enough to accommodate the planned 250+ mutual aid bucket trucks.

The second focus of the project is to centralize expertise and training and enhance the ability to respond to extreme weather events through training, exercises, and drills. The Center will provide training and opportunities to conduct drills with first responders, municipal officials, telecom companies, and other utilities. The Center will also provide education to the public on extreme weather events, safety education, and conservation measures during extreme weather events like heat waves. During actual extreme weather events, real-time coordination between all the above stakeholders can be based at the Center, and if the situation permits, the Center could also be used by neighboring utilities, especially if the extreme weather event impacts are more significant there.

This program is a shared initiative between Con Edison and O&R, with both utilities allocating funds toward its execution. The first phase of this program will focus on the construction of the facility, which is expected to be in service in the first quarter of 2030.

Climate Change Justification

On an operational level, the increasing frequency and intensity of extreme weather events may exceed O&R's current emergency preparedness capabilities. Thus, the implementation of the Storm Resilience Center is critical.

The CCVS concluded that O&R's distribution system is vulnerable to extreme weather events like those that have been experienced in recent history, including hurricanes and tropical cyclones. Projections indicate that hurricanes in the service territory will likely become more intense in the future, with higher rainfall amounts relative to historical hurricanes, stronger winds, and coastal storm surge. Numerous evaluations following actual events have also revealed that the increased frequency of these types of events tends to erode people's ability to cope with and recover from the impacts and that disadvantaged communities are the least able to recover. Furthermore, there is high confidence that the probability of coincident extreme events will likely continue to increase in both frequency and intensity in the future. When extreme events occur concurrently or sequentially to other events, efforts to respond become more difficult, and the impacts can become intensified or cascading.

The proposed Storm Resilience Center will provide advanced support capabilities for O&R's communities and customers. Furthermore, with the increase in extreme weather events occurring throughout the country, it may become more difficult to rely on local mutual aid during storm events in the future. Without the Center's capabilities, O&R and the communities they support could experience extended outage periods in cases of severe storms with extensive damage. Thus, this investment is important for more efficient and faster recovery times after storms.

Funding Request

2025-2029	2030-2034	2035-2044
$12,980,000	$1,110,000	$2,770,000

Long-Term Roadmap

The Center is expected to be in service starting in the first quarter of 2030. Afterward, O&R and Con Edison will continue to operate and maintain the Center indefinitely.

Governance

O&R and Con Edison have aligned to establish a single climate adaptation corporate governance approach for the combined organizations. O&R will establish a clear structure and responsibilities to foster accountability and transparency in its climate adaptation efforts. This structure will enable the Company to maintain progress on incorporating climate change into the Company's assets, operations, and planning. The governance approach includes:

- A **Corporate Instruction** that governs how the Company integrates climate change information into its processes for designing, building, and investing in resilient infrastructure, as well as planning for emergency weather events.
- Internal design guidelines that provide climate change projections and guidance on its use in planning, design, operations, and other Company processes.
- The **Climate Risk and Resilience Executive Committee**, which is responsible for providing oversight and organizational support for the development, coordination, communication, and implementation of strategies to prepare and adapt to climate change and incorporate climate change projections into Company organizations, policies, and practices.
- A **Climate Risk and Resilience Group** that assists operating and planning groups with their adaptation and resilience efforts, continues to monitor climate change science, and continues the Company's engagement with stakeholders. It reports to the executive committee.

- A procedure to provide **public reporting** on its progress, continued risk management activities, and financial risks related to climate change through the Company's annual Sustainability Report and other industry-standard risk reporting frameworks.[xii]

This governance structure continues to provide a comprehensive and coordinated climate change adaptation effort. It also provides the appropriate responsibility, oversight, and guidance. Figure 6 below shows how these components relate to one another.

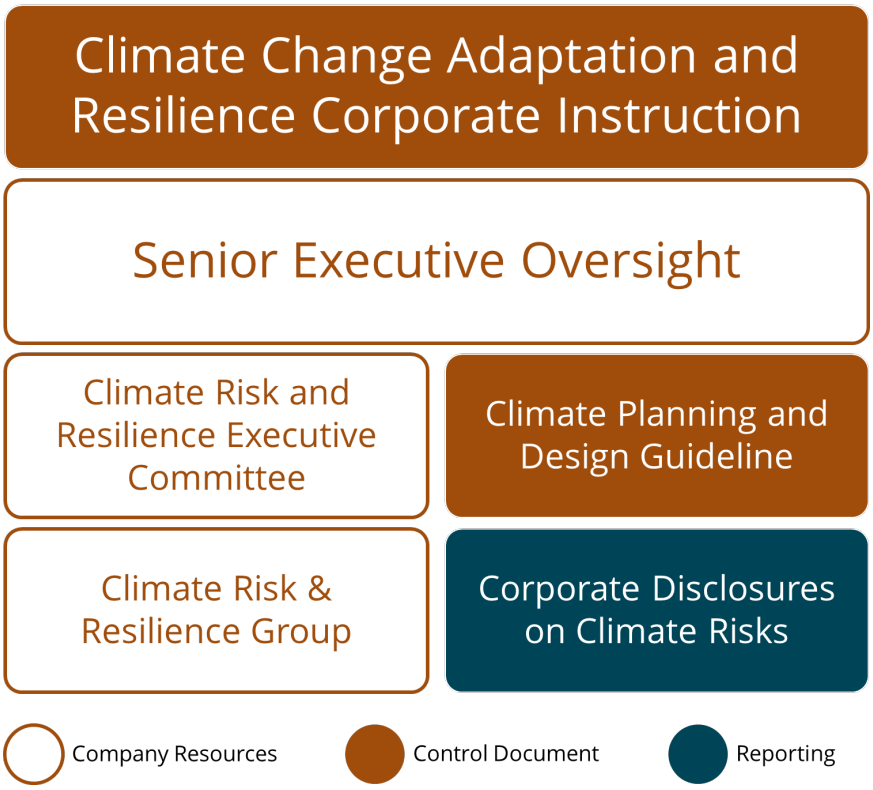
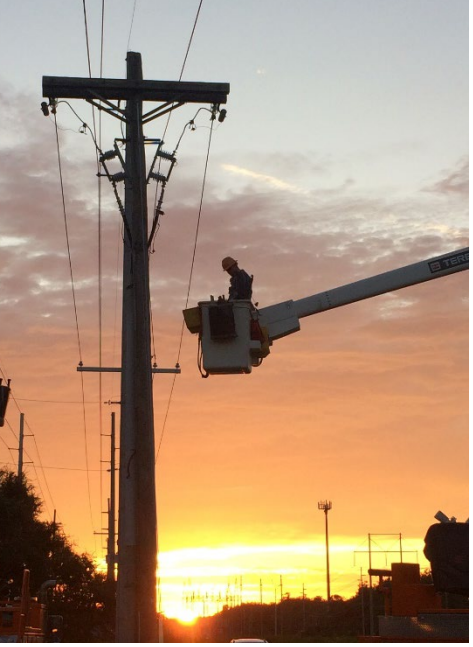


Figure 6. Climate Adaptation Governance Elements

[xii] CEI reports using the ESG/Sustainability disclosure guidelines and templates developed by the Task Force on Climate-related Financial Disclosures (TCFD), the Sustainability Accounting Standards Board (SASB), and the Edison Electric Institute (EEI) and the American Gas Association (AGA). These disclosures are accessible at https://lite.conedison.com/ehs/2022-sustainability-report/sustainability-reports/.



Performance Measures

Resilience performance measures are used to track the implementation process (*i.e.*, output-based measures) and, ideally, the effectiveness of resilience investments (*i.e.*, outcome-based measures). Implementation performance measures are needed for tracking project progress, while effectiveness performance measures are needed to measure improvements in resiliency. There is no standardized set of performance measures for the resilience of electric distribution systems.[24] Resilience performance measures are difficult to define and formalize because they are centralized around "individual, low-frequency events [so] it is often not possible to base metrics on historical data".[25] However, O&R recognizes the importance of resilience performance measures to track progress, collect lessons learned, and improve future iterations of this CCRP.

The following sections outline O&R's existing efforts to quantify resilience performance, the current state of the literature on performance measures, and the Company's plan for reporting on resilience performance over the coming years.

Existing Performance Measures Related to Resilience

O&R conducted retroactive performance and distribution automation analyses after Tropical Storm Isaias to assess the number of customer outages avoided (see Table 10 below). However, this effort was conducted manually and was labor intensive.

Storm Event	Tropical Storm Isaias (August 2020)	Christmas 2020	Tropical Storm Ida (September 2021)
How many customer outages were avoided by Distribution Automation?	66 Auto-Loops and 21 Reclosers operated, preventing outages to: 64,000 customers	32 Auto-Loops and 9 Reclosers operated, preventing outages to: 36,400 customers	8 Auto-Loops and 2 Reclosers operated, preventing outages to: 8,370 customers

How many customer outages were shortened by remote switching?	237 switch steps were executed, shortening outages to 73,150 customers	152 switch steps were executed, shortening outages to 32,300 customers	20 switch steps were executed, shortening outages to 3,475 customers
Safety related switching steps	265	65	16
How many truck rolls were saved?	502	217	36

Table 10. Post-storm distribution automation analyses conducted during three past major events.

Reliability measures are an imperfect tool for understanding resilience. The main reliability metrics O&R currently uses to track system reliability are the System Average Interruption Duration Index (SAIDI), System Average Interruption Frequency Index (SAIFI), and Customer Average Interruption Duration Index (CAIDI). SAIDI and SAIFI measure reliability by averaging outage duration and frequency across customers impacted and number of events over time. CAIDI measures reliability by describing the average time required to restore service to customers. O&R is not proposing to use these metrics because they were designed to measure reliability and typically exclude impacts of major storms. More evaluation is needed to determine if they can be modified to measure resilience, since they were not designed to capture changes in event response. For more information, please refer to Appendix 6: State of the Literature on Resilience Performance Measures.

O&R Proposed Approach for Performance Measures

O&R supports tracking both implementation- and outcome-based resilience performance measures on a bi-annual basis. Implementation-based measures assess progress toward implementing proposed system resiliency enhancements in a timely manner. These include project schedules and budgets, percent of work completed, and others. Every project and program included in this CCRP will be tracked for these implementation-based measures. Outcome-based measures, on the other hand, assess the effectiveness of the proposed system resiliency enhancements, once installed.

For resilience investments which are difficult to directly link to outage reductions, the Company will provide descriptions of the improvements and how they added resilience value to the system in a qualitative manner in the biannual report.

Performance monitoring takes time and resources to complete, due to the following challenges and limitations:

- There is a need for automating outage data and post-storm analysis.

- The Company is accelerating the roll out of distribution automation program to have circuit and feeder level of detail.
- Performance measures will require additional survey efforts (*e.g.*, fallen vegetation on now undergrounded line, flood impact at substation, etc.)
- Reporting on these events and summarizing them is needed.

The proposed measures are subject to change over time as more real-world data becomes available, ideas are shared with other utilities, and industry standards are developed. O&R's proposed approach to implementation-based performance measurement for each investment is summarized in Table 11 below.

Program	Proposed Implementation-Based Measures
NY Accelerated Smart Grid Distribution Automation Program	Number of devices installed per year
Hillburn 138kV Substation Flood Protection Project	Status of planned protection measures
Summitville 34.5kV Substation Flood Protection Project	Status of planned protection measures
Lovett 138kV Substation Flood Mitigation	Status of planned protection measures
Transmission Overhead Structure Replacement Program	Number of overhead structures replaced per year
Shoreline Erosion Protection Program	Number of physical mitigation measures implemented per year
Selective Undergrounding	Miles of circuit undergrounded per year
Con Edison and O&R Storm Resilience Center / Emergency Response Control Facility	Status of facility development

Table 11. Proposed implementation-based performance measures for O&R's Investment Programs and Projects.

O&R's proposed approach to outcome-based performance measurement for each investment is summarized in Table 12 below.

Program	Proposed Outcome-Based Measures
NY Accelerated Smart Grid Distribution Automation Program	Avoided outages
Hillburn 138kV Substation Flood Protection Project	Number of assets affected by a flood
Summitville 34.5kV Substation Flood Protection Project	Number of assets affected by a flood
Lovett 138kV Substation Flood Mitigation	Number of assets affected by a flood
Selective Undergrounding and Transmission Overhead Structure Replacement Program	Average customer outage frequency for undergrounded circuits (pre- and post- hardening, no storm exclusions)
Con Edison and O&R Storm Resilience Center / Emergency Response Control Facility	Time to deploy crews
	Number of times the facility is used

Table 12. Proposed outcome-based performance measures for O&R's Investment Programs and Projects.

Conclusion and Next Steps

As evidenced by recent examples of weather and climate extremes, climate change threatens the operational capacity and strength of O&R's system, and therefore, threatens customer safety and the growing economies which O&R supports. O&R's forward-looking approach and investments described in this CCRP will help the Company continue to provide safe, reliable, and resilient energy to its customers. This CCRP identifies short, and long-term resilience investments and operations changes that will address the known risks of climate change, informed by the latest climate projections and literature relevant to the O&R service territory, as well as input from stakeholders and considerations of equity. Climate resilience governance strategies provide structure and oversight for the implementation of this CCRP, and a project prioritization framework will be used to prioritize the phasing of infrastructure investments.

Prospectively, O&R will work on the implementation of this CCRP, reporting every other year on the identified performance measures. This monitoring and reporting will lead to lessons learned about the effectiveness of resilience investments. Combined with new climate science, these lessons learned will inform future updates of this CCRP (on a 5-year cycle). O&R's investments in climate resilience and commitment to future action will help minimize the current and future impacts of climate change on O&R's customers.

While implementing this Plan will be the primary focus for resilience work moving forward, it will not be the only actions the Company undertakes. O&R understands that the Company can continue to mature in its resilience capabilities and can continue to lead the conversation about what's next for utility resilience work. Along those lines, the Company may consider the following possible next steps:

- Investigate **other resilience metrics.** This Plan outlines a strong set of measures to determine the effectiveness of individual resilience projects and programs, but with

future experience the Company may be able to determine other resiliency metrics to supplement.

- Investigate **potential risk visualization tools** to support decision-making, such as a geospatial tool to visualize both climate exposure and key attributes of assets that may make them more sensitive to the changes in climate (*e.g.*, flagging non-submersible equipment). Developing such a tool can help internally improve alignment around understanding of climate risks. In addition, some of the data could potentially be shared externally to help others improve and expand their resilience planning efforts.
- Expanding methodologies for capturing the **community benefits** of O&R's investments. While it is known that the projects and programs included in this plan will reduce customer outages, it is difficult to estimate the exact magnitude of those benefits and how that translates into a range of financial and non-monetary benefits for customers. This is particularly challenging to do in the unique environment of New York, but developing these capabilities could help the Company to better understand these benefits and could help frame future thinking around investments.
- Better **aligning resilience and decarbonization** efforts by comparing strategies and scenarios to understand gaps and opportunities. Integration of all climate change-related programs, such as net zero initiatives, with climate change resilience programs will enhance the Company's ability to holistically manage climate change.
- Further research/modeling of **wind and ice projections** and integration of these considerations into asset ratings, design standards, etc. The collection of additional weather data can help with the Company's understanding of this topic, and/or a partnership with surrounding municipalities on enhanced modeling could provide similar benefits. Better understanding this topic could allow for better modeling of the impact of adaptation strategies on load in particularly vulnerable portions of the service territory.
- O&R and CECONY have formed a **wildfire** review team, consisting of various operational, engineering, environmental and planning organizations. The team's objective is to review the historical and future impacts of wildfire risk within the Companies' service territories. Based upon the findings of these efforts, the team will develop recommendations to address wildfire risk.
- Continue to explore alternative funding sources for resilience projects such as through the Bipartisan Infrastructure Law funding. Exploring **alternative funding resources** could help O&R implement additional resilience programs above and beyond what may otherwise be possible and/or alleviate the burden placed on rate payers.

For all of the reasons set forth above, the Company respectfully requests that the NYSPSC approve this Plan as filed.

Appendix 1: Physical and Operational Hazard Impact Summaries

The tables below summarize O&R's asset vulnerabilities to each climate hazard.

Vulnerability

Low	Asset/system has low vulnerability to the given climate hazard.
Moderate	Asset/system is moderately vulnerable to the given climate hazard. Vulnerability is influenced by one or more factors including: • Asset is expected to experience increased degradation over time; and • Asset is moderately sensitive to the given climate hazard and/or the increase in magnitude of exposure for the given hazard is moderate, resulting in limited risk of major failure.
High	Asset/system is highly vulnerable to the given climate hazard. Vulnerability is due to: • Asset is highly sensitive and/or the increase in magnitude for the given climate hazard is high, resulting in a high risk of major individual failure or severe degradation of service.

Table 13. Vulnerability rating rubric

	Temperature and Temperature Variable (TV)	Extreme Flooding	Extreme Wind & Ice
Substations	Moderate	High	Low
Overhead Transmission	Moderate	Moderate	Moderate
Overhead Distribution	Moderate	Low	High
Underground Transmission	Moderate	Moderate	Low
Underground Distribution	Moderate	Moderate	Low
Company Facilities	Moderate	Moderate	Low

Table 14. Summary of asset vulnerabilities

Temperature and Humidity

Temperature and humidity represent a moderate concern for O&R's physical assets, as shown in Table 14 above. Higher temperatures can cause reductions in capacity for certain equipment, accelerated degradation (potentially leading to failures and decreased system reliability), as well as physical impacts like line sag. When high temperatures coincide with high humidity, O&R typically experiences a spike in electric demand due to increased air conditioning use. In extreme situations, reduced capacity and increased demand could lead to capacity shortfalls which may require load shedding (*i.e.*, customer outages) or equipment failure. Increasing temperature and humidity have the potential to cause an increase in frequency of customer outages and higher repair costs.

Temperature and TV also represent a risk to O&R's operational processes:

- Load forecasting and load relief planning calculations are heavily influenced by temperature, as high temperature increases demand;
- Higher average temperatures can accelerate vegetation growth, increasing the risk of vegetation contact with power lines; and
- Higher temperatures can also pose a risk to the health and safety of O&R staff who work in the field.

The above risks are somewhat moderate because projected temperature changes in the Company's service territory are relatively gradual through 2050 and 2080.

Flooding

Flooding represents a high priority hazard for O&R, especially for several specific substations. The O&R service territory is expected to experience increased flooding due to sea level rise in the Hudson River and increasing heavy precipitation. These events would affect inland and riverine flooding throughout the service territory, not just Hudson River assets. Extreme storms, such as hurricanes, are also likely to increase in frequency and intensity, bringing with them the possibility of storm surge.

The latest climate science finds that a 16-inch rise in sea level by 2050 (relative to 1995-2014 sea levels) could expose one Company substation to flooding and higher precipitation could expose two Company substations, located near riverine systems, to flooding in a 1% annual chance flood. Rainfall intensity is also expected to increase in the O&R service territory. In July 2023, for example, the O&R service territory experienced a 1-in-1,000 year (0.1% annual chance) rainfall event. With projected increases in the frequency and intensity of heavy rainfall, the chance of what is now a 1-in-1,000-year rainfall event could become closer to the current 1-in-100-year rainfall. This could result in more frequent equipment damage, ongoing corrosion issues, and

reduced access if surrounding roads are flooded. These impacts could result in more frequent outages with longer repair times and higher costs of recovery.

An increase in flooding due to sea level rise, precipitation, or storm surge will also likely result in more frequent activations of O&R's emergency response procedures. Although the Company has developed a robust emergency management framework, an increase in extreme events could still impact the Company's resources and delay recovery.

Wind and Ice

Wind and ice have historically been difficult to model due to their highly localized nature. To inform the CCVS, O&R acquired an additional data set from MIT that provides insight into future wind speeds and radial icing potential. This data set and other studies summarized in the CCVS demonstrate that wind speeds will likely increase during the 21st century and there will remain a risk of radial icing. Extreme storms such as hurricanes can cause wind speeds to increase far beyond typical average speeds and the wind speeds of the most intense hurricanes are projected to increase. While the frequency of freezing rain and radial icing is projected to decrease, the intensity of these events could increase. Projections show the potential for significant icing on occasion, although the magnitude of the trend remains highly uncertain due to the specific atmospheric conditions required for ice storms to occur.

These potential changes in wind and ice present an especially large risk to overhead distribution equipment. Overhead distribution assets, including conductors, attachments, and cross-arms, are built to withstand defined design tolerances for combined ice and wind loading, but they are frequently adjacent to neighboring vegetation that may be downed during these events. Tree contact can cause lines to disconnect and fall, and can even lead to pole collapse, especially older poles or those with existing damage. This would result in asset failure, leading to outages and restoration costs.

Increases in storm frequency and intensity also present a risk to O&R's emergency response capabilities. More frequent activations could impact the Company's available staff and spare equipment resources.

Extreme and Coincident Events

Global Climate Models are limited in their ability to resolve extreme weather events due to the small spatial and time scales at which these events occur, the shortness of the historical record relative to the rarity of the events, and the complex and rare environmental and meteorological conditions that promote their formation. This necessitates an evaluation of extreme events using historical analogs and projections from scientific literature. This assessment supplements the projections developed by Columbia University to provide a broader understanding of potential future extreme events under the influence of climate change in the O&R service

territory. Each extreme event characterizes the differing projected future changes in terms of frequency and intensity across the O&R service territory.

- Hurricanes and tropical cyclones are projected to increase in maximum sustained wind speed and wind gust intensity but will likely experience no change in overall frequency.
- Snow and ice events will likely decrease in frequency as the atmosphere warms, but there could be larger snowfall totals for the largest snow events and increased radial ice accumulation.
- Cold snaps and polar vortex events will likely decrease in frequency, but complex processes amplified by climate change, such as Arctic amplification, could worsen some cold snaps and polar vortex events.
- Drought and wildfire are projected to increase in both frequency and intensity, due to projected increases in temperature, precipitation variability, and the occurrence of lightning strikes.
- Lightning and tornadoes could potentially increase in frequency and intensity due to projected changes in atmospheric conditions that facilitate thunderstorms and their associated severe weather, such as projected increases in temperature coupled with increases in atmospheric water vapor.

Extreme and coincident events can amplify the damage to energy infrastructure and can significantly hamper emergency response activities. These events potentially put O&R workers at risk and are the most likely to result in prolonged outages for customers. They also strain other infrastructure systems that O&R relies on, such as municipal stormwater drainage systems and the transportation network. These interdependencies can exacerbate the impacts to the Company's system.

Appendix 2: CRWG Meetings

O&R has convened 6 CRWG meetings over the course of this resilience planning effort.

CRWG meeting #1 was held on August 10, 2022, and included the following topics:

- Increase in extreme weather events;
- Paulin Law Legislation discussion;
- CCVS and CCRP processes;
- Working Group engagement structure;
- Timeline of execution; and
- Stakeholder input and engagement.

CRWG meeting #2 was held on December 12, 2022, and included the following topics:

- Past Resiliency Investments;
- CCVS and CCRP process;
- Climate model data analysis;
- Survey Feedback; and
- Vulnerability discussion.

CRWG meeting #3 was held on March 29, 2023, and included the following topics:

- CCVS update;
- Climate pathway selection;
- Vulnerability assessment;
  - Flood exposure assessment;
  - Climate hazards: heat, electric load, flooding, wind, ice;
- Climate hazard qualitative findings; and
- Survey feedback.

CRWG meeting #4 was held on June 22, 2023, and included the following topics:

- CCVS and CCRP progress update;

- Climate hazards: heat, electric load, flooding, wind, ice;
- MIT dataset key takeaways;
- Vulnerability assessment results;
- Potential adaptation options;
- Temperature & Humidity, flooding and sea level rise, and wind & ice;
- Operational vulnerabilities;
- CCVS preview; and
- CCRP outline.

CRWG meeting #5 was held on August 29, 2023 and included the following topics:

- CCVS and CCRP progress;
- Discuss feedback on the vulnerability study; and
- Preview planned adaptation and resilience measures.

CRWG meeting #6 was held on October 20, 2023 and covered the following topics:

- Stakeholder feedback on CCRP; and
- Review of O&R planned adaptation/resilience measures.

Attendees of CRWG meetings included representatives from:

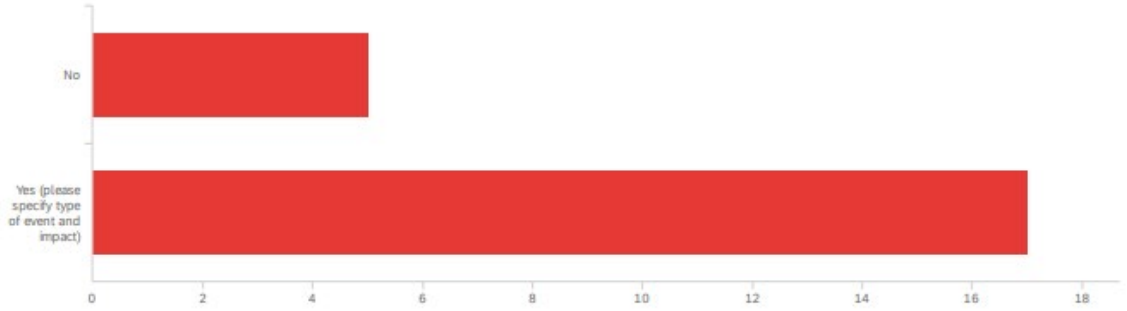
- Chestnut Ridge Village
- City of Middletown
- City of Port Jervis
- New York State Department of Public Services
- Hudson Valley Regional Council
- Integral Building, Village of Nyack 2030 Committee
- Keep Rockland Beautiful
- New York Geothermal Energy
- NYSERDA
- Orange County Executive
- Rockland Conservation & Service Corps
- Sustainable Warwick
- Town of Clarkstown
- Town of Forestburgh
- Town of Goshen

- Town of Haverstraw
- Town of Ramapo
- Town of Stony Point
- Town of Wallkill
- Town of Warwick
- Village of Chester
- Village of Chestnut Ridge
- Village of Harriman
- Village of Haverstraw
- Village of Monroe
- Village of New Square
- Village of Nyack
- Village of Nyack 2030 Committee
- Village of Otisville
- Village of Piermont
- Village of South Blooming Grove
- Village of Upper Nyack
- Village of Wesley Hills
- Village of Woodbury
- Village of Wurtsboro

Appendix 3: CRWG Surveys

4/6/2023 CRWG Survey Results

Q – Has your organization or jurisdiction experienced severe impacts from weather events in the past five years?



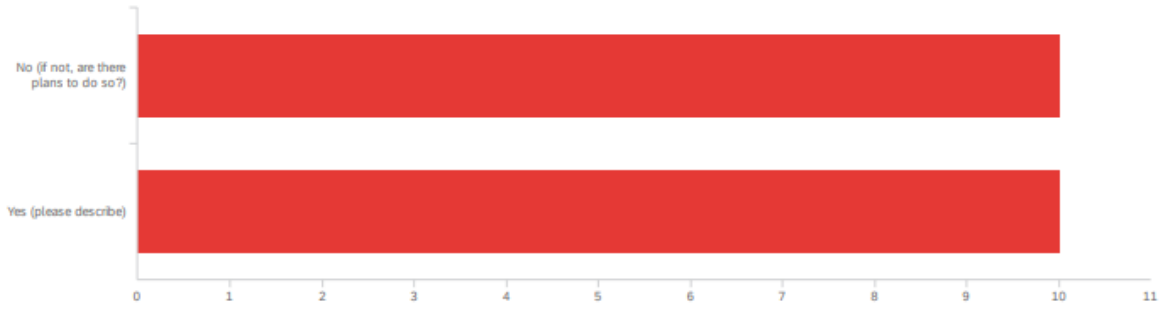
#	Field		Choice Count
2	No	22.73%	5
4	Yes (please specify type of event and impact)	77.27%	17
			22

Q – Yes (please specify type of event and impact)

- flooding from large precipitation events, trees downed from mini-tornados, tree limbs downed from ice storms, car crashes from black ice.
- Heavy Rainfalls and Wind Storms.
- Hurricanes causing flooding, power outages and road closures.
- Flooding and storm damage
- Both heat and storm related events has greatly impacted our Village. Blackouts, powerlines knocked down both in winter and seasonal rain storm. On several occasions we have had many parts of the Village without power.
- Outages due to severe storm events. Localized flooding and erosion. Trees down from wind events.
- Heavy snow, ice, flooding rain, high winds and microbursts
- The last hurricane to blow threw [sic] our area may have eroded the footings to one of our bridges. Severe flooding on Park Avenue.

- In summer of 2021 our Village Hall was out of service for several days following a storm
- High wind events resulting in downed trees w/ blocked roads and utility interference
- Wind and snow storm
- power outages from snow storms
- Hurricane Ida
- heavy rains, intermittent flooding
- Tropical Storm Ida blew out a storm drain pipe on Martha Road in September 2021 (still working with FEMA on funding the repairs).
- Hurricane ,blizzard , lost power ,flooding, wind damage drought and heat waves

Q – Has your organization or jurisdiction taken any action to evaluate climate-related risks to your infrastructure and/or operations?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Has your organization or jurisdiction taken any action to evaluate climate-related risks to your infrastructure and/or operations? - Selected Choice	2.00	4.00	3.00	1.00	1.00	20

#	Field		Choice Count
2	No (if not, are there plans to do so?)	50.00%	10
4	Yes (please describe)	50.00%	10
			20

Q - No (if not, are there plans to do so?)

We have discussed some mitigation efforts on new building heights, generators, etc.

While not specifically on climate-related risks, our Emergency Planning is continually evaluating risks to our infrastructure and operations including climate-related risks in the future.

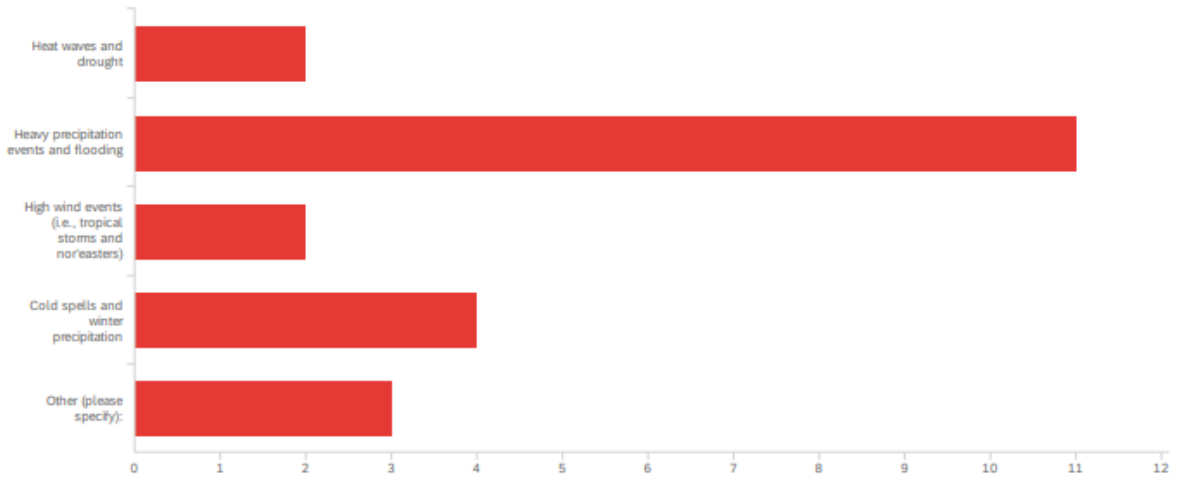
Program evaluations ongoing

No specific plans. For the most part the Village's infrastructure is in good shape and we do not anticipate major damage (even the item mentioned above was not a major issue and will not be overly expensive to repair)

Q – Yes (please describe)

- Some municipalities are considering moving certain infrastructure / buildings, but local governments continue to build in floodplains, too close to waterways, remove too many trees during development thereby eliminating the natural cooling capacity from tree shade
- County risk assessment on Minesceongo Creek Watershed
- Nyack completed a resiliency assessment in the Climate Smart Resiliency Planner in the Climate Smart Communities Program in 2019. The Village is about to create a vulnerabilty assessment supported by ICLEI USA and then develop an adapation plan as part of its Nyack 2030 Climate Action Plan.
- We have discussed shelter locations ie: firehouse , schools and DPW garage, Village Hall. Looking at back up generators for our DPW and VH.
- County mitigation plan participant.
- We recently created a Climate Smart Taskforce Evaluated flood zones and modified flood elevations
- Evaluated as part of our Emergency Response Plan and Cybersecurity Plans
- Cleaned drains and ditching

Q – What weather events are of greatest concern to your organization or jurisdiction?



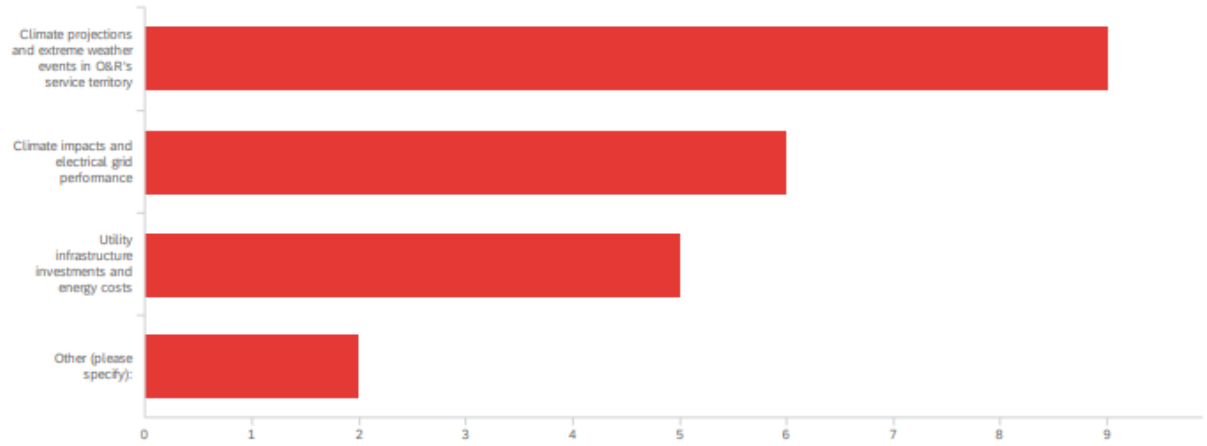
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What weather events are of greatest concern to your organization or jurisdiction? - Selected Choice	1.00	5.00	2.77	1.24	1.54	22

#	Field		Choice Count
1	Heat waves and drought	9.09%	2
2	Heavy precipitation events and flooding	50.00%	11
3	High wind events (i.e., tropical storms and nor'easters)	9.09%	2
4	Cold spells and winter precipitation	18.18%	4
5	Other (please specify):	13.64%	3
			22

Q – Other (please specify):

- Only allows 1 choice but in addition to floods, winter precipitation and high winds rank very high also
- High wind events as they can affect our water distribution systems and treatment facilities. And drought conditions and water supply adequacy
- For the most part all of the above are of equal concern.

Q – What topics are you most interested in discussing and learning more about through O&R Climate Resilience Working Group meetings?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What topics are you most interested in discussing and learning more about through O&R Climate Resilience Working Group meetings? - Selected Choice	1.00	4.00	2.00	1.00	1.00	22

#	Field		Choice Count
1	Climate projections and extreme weather events in O&R's service territory	40.91%	9
2	Climate impacts and electrical grid performance	27.27%	6
3	Utility infrastructure investments and energy costs	22.73%	5
4	Other (please specify):	9.09%	2
			22

Q – Other (please specify):

- O&R's plans for helping customers adapt to climate change and how O&R will adjust its practices to allow the natural environment to reduce climate related costs.
- Resiliency plan

Q - Please provide any questions or comments regarding the Climate Vulnerability Study and Resilience Plan process which we can address at the next O&R Climate Resilience Working Group Meeting.

- How O&R will adjust its practices to allow the natural environment to reduce climate related costs for itself and its customers?

- N/A
- none at this time
- I'm wondering if the growing use of EVs will be able to contribute to backup energy supplies if/when power goes out for extended periods in the future.
- As always the Village is concerned with O&R being able to provide reliable power and quick repairs as well as clear communication with both the municipality and residents during and after an extreme weather event.
- More concerned about grid vulnerability and transmission supply disruption . Also grid capability to meet green push demands .

Appendix 4: Defining Overburdened/Disadvantaged Communities

To help identify areas to prioritize investments, O&R is utilizing the DAC map developed by New York State. In 2019, New York State signed into law the Climate Leadership and Community Protection Act (CLCPA), requiring the State to consider DACs in regulatory actions, among other requirements. As defined in NYS Environmental Conservation Law §75-0111, DACs are identified "based on geographic, public health, environmental hazard, and socioeconomic criteria, which shall include but are not limited to:

1. Areas burdened by cumulative environmental pollution and other hazards that can lead to negative public health effects;
2. Areas with concentrations of people that are of low income, high unemployment, high rent burden, low levels of home ownership, low levels of educational attainment, or members of groups that have historically experienced discrimination based on race or ethnicity; and
3. Areas vulnerable to the impacts of climate change such as flooding, storm surges, and urban heat island effects."[26]

The CLCPA charged the Climate Justice Working Group (CJWG) to lead the development of criteria to identify DACs to confirm that underserved communities' benefit from climate change investments. The CJWG comprises representatives from environmental justice communities, members of rural and urban communities, and representatives from the New York State Departments of Environmental Conservation, Health, Labor, and NYSERDA. The criteria underwent a robust process with multiple rounds of feedback and iterations. On March 27, 2023, the CJWG voted to approve and adopt the final DAC criteria. The CJWG identified 35%, or 1,736 census tracts in New York State as DACs. The tracts are identified based off 45 indicators, some including potential pollution exposures, potential climate change risks, income, and race and ethnicity. For a full list of indicators see Technical Documentation on Disadvantaged Communities Criteria. O&R acknowledges that not all of the indicators are best for identifying populations that are disproportionately burdened by energy outages, though when used as a whole, it serves as a useful planning tool and is currently the best publicly available resource for understanding this topic.

The CJWG released an accompanying interactive map geographically plots census tracts in New York State and indicates those identified as DACs.[xiii] The Company is adopting this valuable tool to help identify where investments are to be prioritized throughout the O&R service territory.

[xiii] To view the full map, see https://www.nyserda.ny.gov/ny/disadvantaged-communities

Appendix 5: Project and Program Details

Contents

Hillburn 138kV Substation Flood Protection Project

Substation Engineering

1. Project / Program Summary

Type: ☒ Project ☐ Program	**Category: ☒ Capital ☐ O&M**
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Hillburn 138kV Substation Flood Protection Project	
Project/Program Manager: Mike Homenick	**Project/Program Number (Level 1):**
Status: ☒ Initiation/Planning ☐ In-Progress (Projects Only) ☐ On-going (Programs Only)	
Estimated Start Date: Q1 2025	**Estimated Date In Service: Q4 2025**
2025-2029 Funding Request ($000) **Capital: $500** **O&M: $0**	

Work Description:

Orange and Rockland Utilities, Inc. (O&R or the Company) is proposing near-term flood protection measures for its Hillburn substation. In the near-term (2025-2029) flood protection measures will focus on installing a perimeter berm. The estimated cost of installing a berm is $500K and is planned to be completed in 2025. This measure is intended to mitigate the impact of a flooding event in order to provide some level of resilience to inundation and is proposed as a storm hardening measure in the Climate Change Resilience Plan filing, as required by Public Service Law (PSL) § 66(29); PSC Case 22-E-0222.

In the medium-term (2029-2032), upgrades are scheduled for the Hillburn substation to increase capacity. The plan includes two new transformers, new switchgear, and control building modifications. This work will utilize O&R's new Climate Change Planning and Design Guideline to incorporate climate change considerations into the design, including but not limited to: elevating the new equipment, waterproofing cabinets, and increasing the site grade for new equipment. These upgrades, including the incorporation of the new design standards, will be addressed in a future rate case, rather than being requested in this filing.

In the longer term, for resiliency purposes, O&R plans to rebuild the substation in a nearby location, outside the floodplain.

Justification Summary:

This project will address flood risk at the Hillburn substation. The Hillburn substation is located within the floodplain. Combined with the escalating frequency of heavy precipitation and flood events due to climate change, this location puts it at risk of flooding from stream/river overflow from the Ramapo River during extreme rainfall events. Projections suggest that the number of days per year with precipitation exceeding 2 inches could increase 45% (5 days) by 2050 and 77% (6 days) by 2080 at Dobbs Ferry, relative to a baseline of 3 days. Days with more than 2 inches of rain in a 24-hour period are closely related to flash flooding events, which can overwhelm drainage systems and cause urbanized flooding, as seen during Hurricane Ida in 2021.

If flood waters were to inundate the site during a flood, the substation equipment could experience sudden failure. Flooding impacts can be severe enough to disable equipment and lead to circuit failures, which can affect system reliability and life expectancy of the assets. Climate change further exacerbates flood hazards at the site; New York State guidance recommends assuming a 20% increase in future 100-year flows based on climate data.

Figure 1. Hillburn Substation yard (red dot) is located next to the Ramapo River and within the FEMA 500-year flood plain extent.

Per the Climate Change Planning and Design Guideline, O&R will use the following flood design elevations and inundation depths for Hillburn substation design:

Time horizon	2025-2028	2029 and beyond
Design flood elevation	290 ft NAVD88	293 ft NAVD88
Flood depth	1-4 feet	3-6 feet

Table 1. Current and future projected flood inundation depths at Hillburn substation yard.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

Impact on Disadvantaged Communities

This project has been identified as a measure to mitigate climate-related risks across the O&R system based on potential system vulnerabilities, agnostic to customer demographics. This project will benefit all customers served by facilities included in-scope for this project, including customers in Disadvantaged Communities.

Impact on Greenhouse Gas (GHG) Emissions

The Hillburn Substation Flood Protection project will have no direct impact on GHG Emissions.

Impact on Clean Energy Commitment

The Hillburn Substation Flood Protection project supports Initiative 2 under Pillar 1 of the Clean Energy Commitment, Build the Grid of the Future.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
O&R has considered accelerating the timeline for replacement of the Hillburn substation. However, the Company rejected this alternative, because O&R determined that it would be cost prohibitive, especially because the higher flood projections occur in later years.

Alternative 2 description and reason for rejection
O&R has considered the alternative of installing a muscle wall or jersey barrier that can be raised during a flooding event. However, O&R concluded that the operational implementation and effectiveness of these temporary flood barrier mitigation measures are limited due to crews needing to be dispatched to raise the wall or barrier in advance of any potential flood event.

Risk of No Action

Risk
If no action is taken, the substation is subject to flooding and equipment damage from extreme precipitation events due to its site elevation and siting within the FEMA 100-year floodplain. This may result in extensive repair or replacement costs and loss of service to customers.

Non-Financial Benefits

Flood protection will increase system resiliency for 3,103 number of customers who are served by the Hillburn substation, including 20 critical facilities. This project also will help avoid customer service outages.

Summary of Financial Benefits and Costs (attach backup)

1. Cost

The estimated cost of raising the perimeter berm at the Hillburn substation is $500,500. Below is a table with cost detail:

Description	Quantity	Unit	Unit Cost	Total Cost	Assumptions
Hillburn Substation - Short Term Flood Control					

Earth Berm – 4 Foot High	1,100	LF	**$250.00**	**$ 275,000**	Berm 4' x 4' with 1 to 1 slope, No Flood Control Gate included. Berm Placement Areas are Accessible and Level
Design, Engineering and Construction Management and AFUDC	1.00	LS		**$ 82,500**	30% of above Costs
Contingency	1.00	LS		**$ 110,000**	40% of above Costs
Escalation Factor for inflation				**$ 33,000**	2.2% escalation per year
TOTAL				**$ 500,500**	

2. Benefit:

In addition to the primary benefits described in the Work Justification and Non-Financial Benefit section, the avoided cost of a flooding event at Hillburn substation includes the following:

1) The estimated cost for re-establishing temporary operation of the Summitville substation following an outage exceeding 24 hours is $2,000,000 which would include installation of a mobile transformer, civil work for a transformer pad, wiring and communications between the transformer and the substation.
2) The cost to replace all of the equipment at Hillburn substation damaged from a flooding event is $75,000,000.

2. Basis for estimate

Please see above for the assumptions included in for the risk analysis to justify the proposed proactive flood protection measure.

Project Risks and Mitigation Plan

Risk 1	Mitigation plan
Length of permitting process could delay the overall project schedule.	Timely submissions and responses in regard to permit applications and questions/comments/concerns submitted by permitting entities.

Technical Evaluation / Analysis

As part of CCVS the flood depths for the inundated substation sites are identified and are noted above under the Justification Summary section.

Project Relationships (if applicable)

N/A

3. Funding Detail ($000)

2019-2024 Actual/Forecast Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Forecast 2023	Forecast 2024
O&M	-	-	-	-	-	-
Capital	-	-	-	-	-	-

2025-2029 Request:
Total Request by Year:

	Request 2025	Request 2026	Request 2027	Request 2028	Request 2029
O&M	**$0**	**$0**	**$0**	**$0**	**$0**
Capital (Total)	**$500**	**$0**	**$0**	**$0**	**$0**
Labor	$50	$0	$0	$0	$0
M&S	$25	$0	$0	$0	$0
Contract Svcs.	$350	$0	$0	$0	$0
Other	$25	$0	$0	$0	$0
Overheads	$50	$0	$0	$0	$0

Long Range Funding Projections

	2030-2034	2035-2039	2040-2044
O&M	**$0**	**$0**	**$0**
Capital	**$0**	**$0**	**$75,000**

Explanation of Long-Range Funding Projections:

The long-term scope described in the Work Description section has an estimated cost of $75M. The Company will update the project cost for the rebuilt station in a future CCRP.

Summitville 34.5kV Substation Flood Protection Project

Substation Engineering

1. Project / Program Summary

Type: ☒ Project ☐ Program	**Category: ☒ Capital ☐ O&M**
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Summitville 34.5kV Substation Flood Protection Project	
Project/Program Manager: Mike Homenick	**Project/Program Number (Level 1):**
Status: ☒ Initiation/Planning ☐ In-Progress (Projects Only) ☐ On-going (Programs Only)	
Estimated Start Date: Q1 2025	**Estimated Date In Service: Q4 2025**
2025-2029 Funding Request ($000) **Capital: $140** **O&M: $0**	

Work Description:

Orange and Rockland Utilities, Inc. (O&R or the Company) is proposing near-term flood protection measures for its Summitville substation.

In the near-term (2025-2032) flood protection measures will focus on installing a paved perimeter berm (maximum 30 inch tall). The estimated cost of installing a berm is $137K and is planned to be completed in 2025. This measure is intended to mitigate the impact of a flooding event in order to provide some level of resilience to inundation and is proposed as a storm hardening measure in the Climate Change Resilience Plan filing, as required by Public Service Law (PSL) § 66(29); PSC Case 22-E-0222.

In the medium and long-term (2032 or later), the rebuild of the Wurtsboro Substation will then serve the Summitville circuits.

Figure 1. View of the Summitville substation yard.

Justification Summary:

This project will address flood risk at the Summitville substation. The Summitville substation is located in the FEMA 100-year floodplain and is therefore at risk of flooding due to stream/river overflow during extreme rainfall events. Flood protection measures are based on mitigating a flood depth of 2.2 feet during a FEMA 100-year flood.

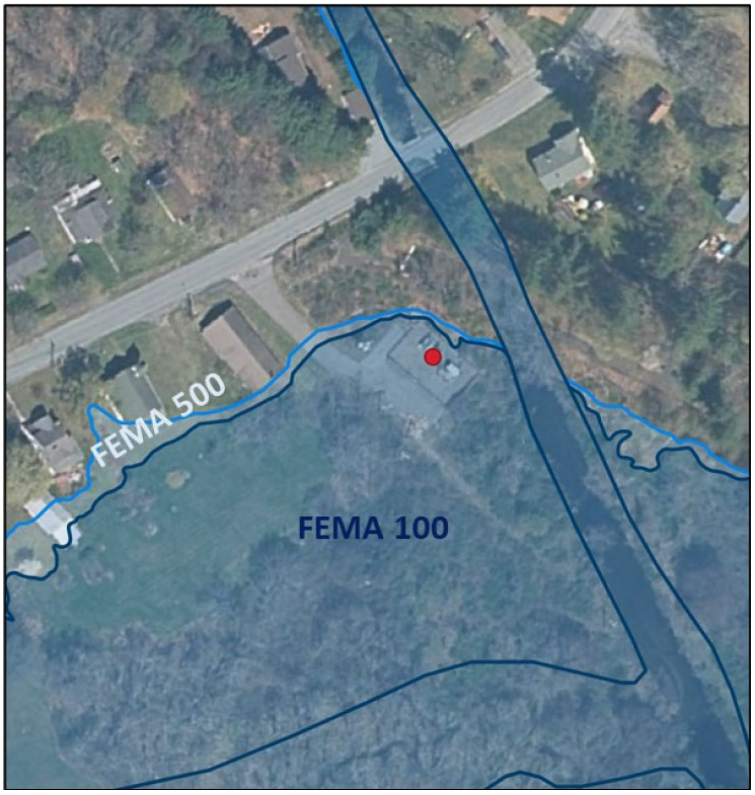


Figure 2. Summitville Substation yard (red dot) is located next to the Delaware and Hudson Canal and is within the FEMA 100-year flood plain extent

The Summitville substation's location within the FEMA 100-year floodplain, coupled with the increasing intensity of precipitation events due to climate change, places it at risk of flooding from stream/river overflow from the Delaware and Hudson Canal during extreme rainfall events. Climate change may lead to more intense hurricanes in the North Atlantic, increasing maximum sustained wind speeds by approximately 5%, and rainfall amounts by approximately 10% to 15% relative to historical hurricanes. More intense storms bring stronger hurricane winds, storm surge, and rainfall. Furthermore, projections suggest that the number of days per year with precipitation exceeding 2 inches could increase 45% (5 days) by 2050 and 77% (6 days) by 2080 at Dobbs Ferry, relative to a baseline of 3 days. Days with more than 2 inches of rain in a 24-hour period are closely related to flash flooding events, which can overwhelm drainage systems and cause urbanized flooding, as seen during Hurricane Ida in 2021.

Substation equipment is typically not designed to come into contact with water and can experience sudden failure if so exposed. As the substation approaches its planned retirement in 2032, the cumulative risk of experiencing multiple flooding events amplifies the potential for damage. Flooding

impacts can be severe enough to disable equipment and lead to circuit failures, which can affect system reliability and life expectancy of the assets.

Climate change further intensifies flood hazards at the site; New York State guidance recommends assuming a 20% increase in future 100-year flows based on climate data. Failures not only jeopardize the lifespan of the equipment but also can result in extended system outages. The conjunction of climate-driven flood risks and the constraints of the current equipment could undermine the operational efficiency of the Summitville substation, leading to financial implications and service disruptions for the communities it serves.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

Impact on Disadvantaged Communities

The Company has identified this project as a measure to mitigate climate-related risks across the O&R system based on potential system vulnerabilities, agnostic to customer demographics. This project will benefit all customers served by facilities included in-scope for this project.

Impact on Greenhouse Gas (GHG) Emissions

The Summitville Substation Flood Mitigation project will have no direct impact on GHG Emissions.

Impact on Clean Energy Commitment

The Summitville Substation Flood Mitigation project supports Initiative 2 under Pillar 1 of the Clean Energy Commitment, Build the Grid of the Future.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
Rather than retiring the 138kV substation yard after 2032 when the circuits are transitioned to the Wurtsboro Substation, the timeline for that transition could be accelerated to an earlier date. However, the O&R timeframe for implementing the proposed transition to Wurtsboro is realistic given the scope of work described in the separate white paper in this filing describing the two (2) – 13.2kV underground feeders from the existing Summitville substation to the new Wurtsboro substation site.

Alternative 2 description and reason for rejection
O&R has discussed the possibility of raising the substation equipment, installing flood barriers (*e.g.*, muscle wall), and installing waterproof cabinets, but concluded that these options are not a cost-effective option given the medium and long-term (2032 or later), transition to the Wurtsboro Substation. Additionally, O&R has found that the operational implementation and effectiveness of temporary flood barrier (*e.g.*, muscle wall) mitigation measures are limited due to crews needing to be dispatched to raise the wall or barrier in advance of any potential flood event.

Risk of No Action

Risk

If no action is taken, the substation is subject to flooding and equipment damage from extreme precipitation events due to its site elevation and siting within the FEMA 100-year floodplain, which may result in extensive repair or replacement costs and loss of service to customers.

Non-Financial Benefits

Flood mitigation will increase system resiliency for 683 number of customers who are served by the Summitville substation, including 2 critical facilities. This project also will help avoid customer service outages.

Summary of Financial Benefits and Costs

1. Cost

The estimated cost of raising the perimeter berm at the Summitville substation is: $136,500. Below is a table with cost detail:

Description	Quantity	Unit	Unit Cost	Total Cost	Assumptions
Summitville Substation - Short Term Flood Control					
Paved Berm - 30" Minimum Height	250	LF	**$250.00**	**$ 62,500**	No Flood Control Gate included. Berm Placement Areas are Accessible and Level
Design, Engineering and Construction Management and AFUDC	1.00	LS		**$ 18,750**	30% of above Costs
Contingency	1.00	LS		**$ 25,000**	40% of above Costs
Escalation Factor for inflation				**$ 30,250**	2.2% escalation per year
TOTAL				**$ 136,500**	

2. Benefits:

In addition to the benefits described in the Work Justification and Non-Financial Benefit sections, the flood mitigation measure may avoid the cost of a flooding event at the Summitville substation, and includes the following:

1) The estimate cost for re-establishing temporary operation of Summitville substation following an outage exceeding 24 hours is $2,000,000 which would include installation of a mobile transformer, civil work for a transformer pad, and wiring and communications between the transformer and the substation.

2. Basis for estimate

Please see above for the assumptions included in for the risk analysis to justify the proposed proactive flood mitigation measures.

Project Risks and Mitigation Plan

Risk 1 Mitigation plan

Length of permitting process could delay the overall project schedule.	Timely submissions and responses in regard to permit applications and questions/comments/concerns submitted by permitting entities.	

Technical Evaluation / Analysis

As part of CCVS the flood depths for the inundated substation sites are identified and are noted above under the Justification Summary section.

Project Relationships (if applicable)

N/A

3. Funding Detail ($000)

2019-2024 Actual/Forecast Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Forecast 2023	Forecast 2024
O&M	-	-	-	-	-	-
Capital	-	-	-	-	-	-

2025-2029 Request:

Total Request by Year:

	Request 2025	Request 2026	Request 2027	Request 2028	Request 2029
O&M	**$0**	**$0**	**$0**	**$0**	**$0**
Capital (Total)	**$137**	**$0**	**$0**	**$0**	**$0**
Labor	$14	$0	$0	$0	$0
M&S	$7	$0	$0	$0	$0
Contract Svcs.	$96	$0	$0	$0	$0
Other	$7	$0	$0	$0	$0
Overheads	$13	$0	$0	$0	$0

Long Range Funding Projections

	2030-2034	2035-2039	2040-2044
O&M	**$0**	**$0**	**$0**
Capital	**$0**	**$0**	**$0**

Explanation of Long Range Funding Projections:

N/A

Lovett 138kV Substation Flood Mitigation Project

Substation Engineering

1. Project / Program Summary

Type: ☒ Project ☐ Program	**Category: ☒ Capital ☐ O&M**
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Lovett 138kV Substation Flood Mitigation Project	
Project/Program Manager: Mike Homenick	**Project/Program Number (Level 1):**
Status: ☒ Initiation/Planning ☐ In-Progress (Projects Only) ☐ On-going (Programs Only)	
Estimated Start Date: Q1 2025	**Estimated Date In Service: Q4 2027**
2025-2029 Funding Request ($000) **Capital: $13,200** **O&M: $0**	

Work Description:

Orange and Rockland Utilities, Inc. (O&R or the Company) is proposing near-term flood mitigation measures for its existing Lovett 138kV substation, which includes a new control house at an elevated height, waterproofing cabinets, and rewiring the substation and connected equipment within the substation yard. The new control house will elevate critical components of the substation beyond the projected flooding level. The estimated cost of installing the new control house at a higher elevation is $10.3M and is planned to be completed in 2025-27 (engineering and design in Year 1, construction in Years 2-3).

O&R will also install of waterproof cabinets to provide additional flood mitigation. Waterproofing cabinets will protect equipment that cannot be elevated due to the overhead transmission lines. The estimated cost of waterproofing 25 cabinets within the 138kV substation yard is $2.78M and is planned to be completed in 2025-27 (engineering and design in Year 1, construction in Years 2-3).

In the longer term, for resiliency purposes, O&R plans to rebuild the substation in a nearby location, outside the floodplain.

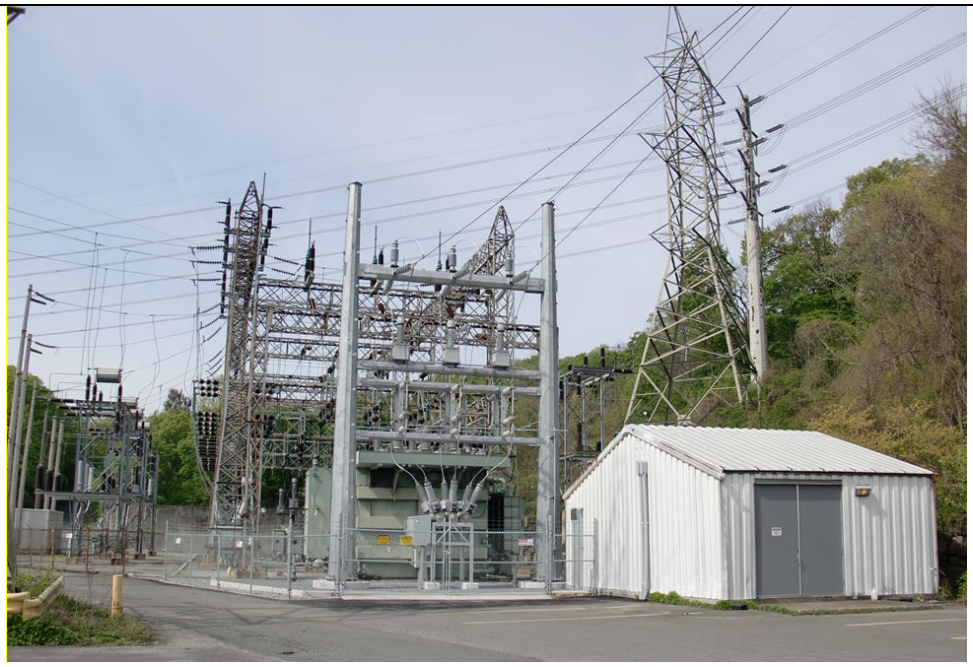


Figure 1. View of the Lovett 138kV substation yard with the control house located in the foreground to the right (white building).

This project is intended to mitigate the impact of a flooding event in order to provide resilience to inundation and is proposed as a storm hardening measure in the Climate Change Resilience Plan filing, as required by Public Service Law (PSL) § 66(29); PSC Case 22-E-0222.

Justification Summary:

This project to install a new control house at elevated height and waterproof cabinets will help mitigate the impact associated with flooding risk at the Lovett substation. Flooding impacts can be severe enough to disable equipment and lead to circuit failures, which can affect system reliability and life expectancy of the assets. The cumulative risk of experiencing multiple flooding events amplifies the potential for damage. Projections suggest that the number of days per year with precipitation exceeding 2 inches could increase 45% (5 days) by 2050 and 77% (6 days) by 2080 at Dobbs Ferry, relative to a baseline of 3 days. Days with more than 2 inches of rain in a 24-hour period are closely related to flash flooding events, which can overwhelm drainage systems and cause urbanized flooding, as seen during Hurricane Ida in 2021. Climate change further intensifies flood hazards at the site; New York State guidance recommends assuming a 20% increase in future 100-year flows based on climate data. Flooding not only jeopardizes the lifespan of the equipment but can also result in extended system outages. The conjunction of climate-driven flood risks and the constraints of the current equipment could undermine the operational efficiency of the Lovett substation, leading to financial implications and service disruptions for the communities it serves.

The Lovett substation is located adjacent to the Hudson River, within the FEMA 100-year floodplain. Coupled with the increasing intensity of precipitation events due to climate change, this location places it at risk of flooding from stream/river overflow.
Projections indicate that sea level for New York State could rise by 9 inches by the 2030s and 16 inches by the 2050s, intensifying riverine flooding events. Substation equipment is typically not designed to come into contact with water and can experience sudden failure if so exposed. Future Hudson River 100-year tidal floods, approximated by the current 500-year inland flood, along with sea level rise are projected to

affect the Lovett substation. Saline exposure from projected increases in storm surge events shifting riverbanks inland and adding inundation to assets can cause corrosion to the equipment and decrease the asset health and lifespan.

Figure 2. Lovett 138kV substation yard shown with and without inundation from the FEMA 100-year flood plain extent due to the Hudson River.

100-Year Flood Depths (ft)	Baseline	2030	2050	2080
Lovett 138 kV	2.32	3.45	4.03	5.19

Table 1. Current and future projected flood inundation depths at Lovett 138kV substation yard.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

As part of the climate change resiliency filing to achieve the goals in the CI 610-4 Climate Change Resilience and Adaptation Plan and/or the November 2023 Climate Resilience Plan, the proposed near-term work at Lovett Substation is focused on flood risk mitigation as described in the Justification Summary above and Benefits Summary below.

Impact on Disadvantaged Communities

The Company has identified this project as a measure to mitigate climate-related risks across the O&R system based on potential system vulnerabilities, agnostic to customer demographics. This project will benefit all customers served by facilities included in-scope, including customers in Disadvantaged Communities (DACs).

Impact on Greenhouse Gas (GHG) Emissions

The Lovett 138kV Substation Flood Mitigation project will have no direct impact on GHG Emissions.

Impact on Clean Energy Commitment

The Lovett 138kV Substation Flood Mitigation project supports Initiative 2 under Pillar 1 of the Clean Energy Commitment, Build the Grid of the Future.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
O&R has investigated the possibility of installing temporary flood barriers at the substation and found that a 7-foot increase in height to the temporary flood barriers is not practical due to limitations with the height dimension of the flood barrier product.

Alternative 2 description and reason for rejection
O&R has investigated the possibility of a permanent wall with a gate. However, the Company rejected this option because it would be prohibitively expensive and poses an access issue.

Alternative 3 description and reason for rejection
O&R has discussed relocating the Lovett 138kV substation prior to its currently scheduled retirement date of 2039; the envisioned project could be accelerated to an earlier date. However, given the volume of other infrastructure projects that are further along the planning process and the prior prioritization of potential projects in determining when those projects would occur, O&R is resource limited to accelerate the substation replacement projects identified in this resiliency filing.

Risk of No Action

Risk 1
If no action is taken, the substation is subject to flooding and equipment damage from extreme precipitation events due to its site elevation and siting within the FEMA 100-year floodplain. This may result in extensive repair or replacement costs and loss of service to customers.

Non-Financial Benefits

Flood mitigation will increase system resiliency for 53,915 customers who are served by the Lovett 138kV substation, including 489 critical facilities. This project will expedite recovery after a flood event by protecting critical substation components, thereby reducing customer outage times.

Summary of Financial Benefits and Costs

1. Cost

The estimated cost of raising the control house and waterproofing cabinets at the Lovett substation is $13,200,000. Below is a table with cost detail:

Description	Quantity	Unit	Unit Cost	Total Cost	Assumptions
Lovett Substation - Short Term Flood Control					
Waterproof Cabinets	25.00	EA	**$ 60,000**	**$ 1,500,000**	Replace existing cabinet with a waterproof cabinet. No conduit / wiring required back to control / power source only local conduit / wiring. Material - $10,000 and Install / Testing - 250 hours.
Raise Control House - REPLACE CONTROL HOUSE ESTIMATED	1.00	EA	**$ 5,500,000**	**$ 5,500,000**	Replace Control House with New Control House. Control House Procurement = $2,000,000. Control House only no Switchgear Replacement.
Design, Engineering and Construction Management and AFUDC	1.00	LS		**$ 2,100,000**	30% of above Costs

Contingency	1.00	LS		$ 3,640,000	40% of above Costs
Escalation Factor for inflation				$ 340,000	2.2% escalation per year
TOTAL				$13,080,000	

2. Benefit: The primary benefit, the proposed mitigation measures focus on mitigating the impact of a flooding event at Lovett substation.

1) The currently estimated cost to replace all of the equipment at the Lovett substation damaged from a flooding event is $75,000,000.

3. Basis for estimate

Please see above for the assumptions included for the risk analysis to justify the proposed proactive flood mitigation measures.

Project Risks and Mitigation Plan

Risk 1	Mitigation plan
Length of permitting process could delay the overall project schedule.	Timely submissions and responses in regard to permit applications and questions/comments/concerns submitted by permitting entities.

Risk 2	Mitigation plan
Obtain long lead time project materials.	Materials with long lead times, especially the control house, are reviewed and orders are placed 1 to 2 years before the project is under construction in order to meet project deadlines.

Risk 3	Mitigation plan
Technical difficulties to install new raised control house or waterproof cabinets.	Leverage other utilities' experience and expertise on potential technical solutions to installing new control house or waterproof cabinets while maintaining substation service.

Technical Evaluation / Analysis

As part of CCVS the flood depths for the inundated substation sites are identified and are noted above in the Justification Summary section.

Project Relationships (if applicable)

N/A

3. Funding Detail ($000)

2019-2024 Actual/Forecast Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Forecast 2023	Forecast 2024

O&M	-	-	-	-	-	-
Capital	-	-	-	-	-	-

2025-2029 Request:

Total Request by Year:

	Request 2025	Request 2026	Request 2027	Request 2028	Request 2029
O&M	**$0**	**$0**	**$0**	**$0**	**$0**
Capital (Total)	**$2,548**	**$5,249**	**$5,406**	**$0**	**$0**
Labor	$382	$787	$811	$0	$0
M&S	$637	$1,312	$1,351	$0	$0
Contract Svcs.	$1,019	$2,099	$2,162	$0	$0
Other	$127	$262	$269	$0	$0
Overheads	$383	$789	$813	$0	$0

Long Range Funding Projections

	2030-2034	2035-2039	2040-2044
O&M	**$0**	**$0**	**$0**
Capital	**$0**	**$0**	**$75,000**

Explanation of Long Range Funding Projections:

The long-term scope described in the Work Description section has an estimated cost of $75M. The Company will update the project cost for the rebuilt station in a future CCRP.

Shoreline Erosion Protection Program

Transmission Engineering

1. Project / Program Summary

Type: ☐ Project ☒ Program	**Category: ☒ Capital ☒ O&M**
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Shoreline Erosion Protection Program	
Project/Program Manager: Jim Heady	**Project/Program Number (Level 1):**
Status: Initiation/Planning ☐ In-Progress (Projects Only) On-going (Programs Only)	
Estimated Start Date: Q1 2025	**Estimated Date In Service: 2025-29**
2025-2029 Funding Request ($000) **Capital: $5,310** **O&M: $1,020**	

Work Description:

This shoreline erosion protection program will include projects to protect shorelines from erosion along that riverfront and establish more robust erosion monitoring efforts. Due to the increased impacts from projected increases in precipitation intensity and flooding, O&R has identified additional lines with the most vulnerable structures for incremental upgrades and/or replacement as part of this program and are listed below. For example, O&R may restore and armor a shoreline structure at an average cost of approximately $800k per location. This funding will accelerate the Company's existing program of structure replacement as a result of increased risk from climate change. The urgency of this program is underscored by the dual challenges of aging infrastructure and the escalating threats posed by climate change, particularly the increasing frequency and severity of major storms.

As part of the shoreline erosion protection program, O&R proposes to expand on existing shoreline protection efforts as described above. Currently, O&R's EHV department has an annual inspection program to identify and prioritize areas with erosion and then implement or plan future mitigation measures. Currently, O&R has caught up on the backlog of immediate shoreline erosion mitigation measures and is looking to transition to a more proactive approach. Having a more proactive approach would help to prevent the erosion from happening in the first place and will include increasing the frequency of inspections and changing the inspection criteria to reflect erosion rates that account for climate change. O&R will expand to include all structures within the 100-year flood plain plus 5-7 feet. Climate change will further exacerbate flood hazards at these sites. New York State guidance recommends assuming a 20% increase in future 100-year flows based on climate data. There are also technology improvements to aid in the erosion inspection that O&R would like to employ to improve results.

This resiliency program is proposed as a storm hardening measure in the Climate Change Resilience Plan filing, as required by Public Service Law (PSL) § 66(29); PSC Case 22-E-0222.

Justification Summary:

Over time, the shoreline of waterways near Orange and Rockland Utilities, Inc.'s (O&R or the Company) transmission structures will be eroded, putting the stability of the structures in jeopardy. In order to maintain the stability of the structures, the shoreline must be repaired. O&R evaluated a number of poles on transmission lines along water ways and determined that shoreline restoration was required in order to maintain the stability of the poles. As an example, most of Line 311 is along the Ramapo River where O&R recently completed an extensive program restoring and armoring about 22 structures along this line. O&R continues to monitor structures on this line and additional flood mitigation may be needed along the Ramapo River. O&R has already identified one location where transmission lines are being impacted by changing environmental conditions along the Ramapo River. Erosion along the Ramapo River has resulted in a significant number of structures requiring shoreline armoring and restoration, some of which have been completed and some are underway. Soil investigations along the river identified locations where poor soil conditions (*i.e.*, saturation) and increased storms have resulted in a number of poles shifting and settling and subsequently requiring replacement.

Without proactive measures to protect and monitor vulnerable shorelines, O&R's infrastructure adjacent to these areas remains at heightened risk due to the intensifying impacts of flooding hazards under climate change. Sea-level rise will result in heightened and more permanent flooding along the banks of the Hudson River, which will contribute to increased shoreline erosion. Projections indicate that sea level for New York State could rise by 9 inches by the 2030s and 16 inches by the 2050s. Additionally, projected increased frequency and intensity of severe coastal storms will result in deeper and more extensive flooding along shorelines, especially when coupled with sea-level rise. Climate change may lead to more intense hurricanes in the North Atlantic, increasing maximum sustained wind speeds by approximately 5%, and rainfall amounts by approximately 10% to 15% relative to historical hurricanes.

The combined effects of sea-level rise and storm surge can permanently shift riverbanks inland and result in additional inundation of O&R assets. As such, the Company's infrastructure near those riverbanks will be at a higher risk of failure due to the unstable soil, causing power disruptions and reducing system reliability. By increasing the frequency and scope of the Company's erosion monitoring program, the Company will be able to identify issues earlier and intervene at an earlier stage with a lower cost solution. Additionally, the Company would like to implement solutions for lower prioritized projects sooner to prevent those from becoming bigger issues at a shorter timeline due to the projected accelerated erosion. No action could also result in more frequent and extensive repair needs and escalating operational costs.

Several river systems run through the O&R service territory, including the Neversink, the Wallkill, the Ramapo, and the Hudson. During and after periods of high precipitation, these rivers have the potential to overflow and inundate surrounding areas. Riverine floodplains are low-lying areas adjacent to rivers that are susceptible to flooding during a storm or high-precipitation event. Federal Emergency Management Agency (FEMA) 100- and 500-year floodplains refer to the areas of land that are flooded during the 100-year (*i.e.*, 1% annual chance) flood event and the 500-year (*i.e.*, 0.2% annual chance) flood event. These floodplain extents do not account for expected changes in future flooding.

In the future, increased precipitation rates from tropical cyclones could lead to a greater risk of inland flooding. Given that the FEMA floodplains are not forward-looking, the present-day 500-year floodplain has been selected to represent the 100-year floodplain for a future with increasing precipitation intensity. The 500-year floodplain shows more extensive flooding throughout the O&R service territory than does the 100-year floodplain, and the highest levels of flooding remain adjacent to river systems.

Sea-level rise will result in heightened and more permanent flooding along the banks of the Hudson River, which may increase the perpetual inundation of coastal O&R assets. The projected increased frequency and intensity of severe coastal storms coupled with rising sea levels will also result in deeper and more extensive flooding, potentially affecting structures not directly on the shoreline. The combined effects of sea-level rise and storm surge can permanently shift riverbanks inland and result in added inundation of O&R assets.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

Impact on Disadvantaged Communities

The Company has identified this program as a measure to mitigate climate-related risks across the O&R system based on potential system vulnerabilities, agnostic to customer demographics. This project will benefit all customers served by facilities included in-scope, including customers in Disadvantaged Communities.

Impact on Greenhouse Gas (GHG) Emissions

The Shoreline Erosion Protection Program will have no direct impact on GHG Emissions.

Impact on Clean Energy Commitment

The Shoreline Erosion Protection Program supports Initiative 2 under Pillar 1 of the Clean Energy Commitment, Build the Grid of the Future.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
O&R considered an alternative of moving the transmission pole/tower and re-routing the line(s) away from the respective shoreline. However, costs for new permitting, easements, and construction to move the structure would be significantly greater than the design and construction to restore and armor the shoreline and be cost prohibitive.

Alternative 2 description and reason for rejection
O&R also considered installing retaining walls to protect the shoreline. O&R would consider this solution when the transmission structure is in close proximity to a narrow stream. However, it may not prevent stormwater from getting behind the wall and allow erosion beneath or near the structures. Furthermore, regulatory agencies prefer shoreline hard or soft armoring over vertical walls and structures so the rip rap solution would be permitted more quickly than the retaining wall solution.

Risk of No Action

Risk 1
In the absence of transitioning to a more proactive shoreline erosion mitigation approach, O&R will continue with the current 5-year inspection approach and prioritize areas showing erosion. However, climate change related flood events may progressively erode the shoreline and progressively encroach on O&R infrastructure. This is true even if the flood event(s) do not reach O&R infrastructure. As a result, the flooding risk to O&R infrastructure increases as the erosion encroachment progresses.

Risk 2
Taking no action would present significant risks to O&R's ability to provide reliable transmission service to the area. Continued erosion can lead to undermining the poles. Transmission structure failure could result in extensive service outages for long periods of time, wildfires, significant property damage and endangerment of the public and wildlife in the area. Repair after structural failure would come at a significant additional cost compared to proactive measures to correct the issue.

Non-Financial Benefits

By investing in the shoreline erosion protection program, O&R not only fortifies its own transmission assets, reducing maintenance costs and minimizing unplanned repair expenditures, but also delivers tangible benefits to its customers. More resilient infrastructure means the risk of a line outage will be greatly reduced, with fewer service interruptions and an overall enhanced customer experience. It will also result in reduced risk of pole collapse and result in fewer on-site repairs, which will lessen potential safety hazards to both the public and O&R's employees and contractors.

Summary of Financial Benefits and Costs (attach backup)

1. Cost:

The total cost of this project is $6,247,000.

2. Benefits:

In addition to the primary benefits described in the Justification Summary and Non-Financial Benefit sections, this program would also avoiding the cost of emergency repairs to a damaged structure , which can cost significantly more than a normal replacement.

2. Basis for estimate

For example, the cost of armoring a shoreline location is $800,000. Below is a table with cost detail:

Description	Unit	Total Cost
Shoreline Armoring – 1 Location		
Permitting, Design & Geotech Investigation	EA	**$ 150,000**

Access & Site Location Civil Work	EA	$ 75,000
Grading & Excavation	EA	$ 125,000
Rip Rap Stone - Furnish & Install	EA	$150,000
Cofferdam Construction & Turbidity Curtain	EA	$100,000
Site Restoration	EA	$75,000
Construction Management	EA	$100,000
AFUDC	EA	$ 25,000
TOTAL		$800,000

Project Risks and Mitigation Plan

Risk 1	Mitigation plan
The time for erosion mitigation planning and permitting must also be taken into account when transitioning to a proactive erosion mitigation program. Length of permitting process could delay the overall project schedule.	Timely submissions and responses in regard to permit applications and questions/comments/concerns submitted by permitting entities.

Technical Evaluation / Analysis

Please refer to the climate change data and analysis in the justification summary above.

Project Relationships (if applicable)

Project relationships are not applicable.

3. Funding Detail ($000)

2019-2024 Actual/Forecast Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Forecast 2023	Forecast 2024
O&M	$90.0	$51.7	$100.1	$149.9	$78.5	$95.0
Capital	-	-	-	-	-	-

2025-2029 Request:

Total Request by Year:

	Request 2025	Request 2026	Request 2027	Request 2028	Request 2029
O&M	$200	$204	$261	$171	$185
Capital (Total)	$1,000	$1,030	$1,061	$1,093	$1,126
Labor	$156	$160	$165	$171	$176

M&S	$0	$0	$0	$0	$0
Contract Svcs.	$656	$676	$696	$717	$738
Other	$32	$33	$34	$35	$36
Overheads	$156	$161	$166	$170	$176

Long Range Funding Projections

	2030-2034	**2035-2039**	**2040-2044**
O&M	**$1,200**	**$1,340**	**$1,490**
Capital	**$6,010**	**$6,700**	**$7,470**
Basis for funding direction:	Annual inflation-related increases estimated (2.2%)	Annual inflation-related increases estimated (2.2%)	Annual inflation-related increases estimated (2.2%)

Explanation of Long Range Funding Projections:

The Company developed cost estimates for this program through 2029. For years 2030-2044, estimated cost represents similar restoration level as 2029 going forward and was escalated by 2.2% for inflation.

Transmission Overhead Structure Replacement Program

Transmission Engineering

1. Project / Program Summary

Type: ☐ Project ☒ Program	**Category: ☒ Capital ☐ O&M**
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Transmission Overhead Structure Replacement Program	
Project/Program Manager: Jim Heady	**Project/Program Number (Level 1):**
Status: ☒ Initiation/Planning ☐ In-Progress (Projects Only) ☐ On-going (Programs Only)	
Estimated Start Date: Q1 2025	**Estimated Date In Service: 2025-2029**
2025-2029 Funding Request ($000) **Capital: $20,140** **O&M: $0**	

Work Description:

Orange and Rockland Utilities, Inc. (O&R or the Company) is proposing a transmission structure replacement program as a proactive approach to replacing poles, such as those along the CSX railroad right-of-way adjacent to the Hudson River where a 1970s beautification effort resulted in the poles being painted. This sealed the poles, causing their interior to deteriorate. More recently, dry conditions in the spring of April 2023 resulted in a brush fire started by a CSX rail train caused damages to O&R's overhead structures along transmission lines 55/56, 551/56 and 551/561, damaging 47 wood poles. Currently, O&R's Electric Ops Extra High Voltage (EHV) department has an annual inspection program to assess overhead pole health and assigns a rating based upon the pole condition.

This program is to expand and accelerate overhead transmission pole replacements by supplementing the current inspection-based pole replacement projects with additional replacements based on an approach that includes the vulnerability of aging poles, placing them with more robust poles, incorporating the applicable current codes and standards. This program will accelerate the Company's existing program of structure replacement to help mitigate the increased risk from climate change. The urgency of this program is underscored by the dual challenges of aging infrastructure and the escalating threats posed by climate change, particularly the increasing frequency and severity of major storms, as well as potential for increased drought and wildfire risk.

The Overhead Structure Replacement Program is an existing Company program aimed at maintaining O&R's transmission structures and will supplement the existing inspection program. Due to the increased impacts from climate change projections, O&R expects to replace both steel structures and wood poles incrementally, and the cost will vary based upon the level of difficulty of access to the site. A cost breakdown is provided in the Summary of Financial Benefits and Costs section below. The program costs reflect both ramping up the pace of pole replacement, as well as the variable accessibility for the transmission (and distribution) rights-of-way across the O&R service territory.

This resiliency program is proposed as a storm hardening measure in the Climate Change Resilience Plan filing, as required by Public Service Law (PSL) § 66(29); PSC Case 22-E-0222.

Justification Summary:

The vulnerability of aging transmission poles to severe weather events creates risks for O&R as well as O&R customers. While an aging pole may have another 20 years of useful life, a severe storm could hit that area and cause damage to the aging pole. A more proactive age-based pole replacement program would mitigate such instance because a modern pole will be more resilient to the storm event if it occurs. While there is redundancy in the transmission pathways for electricity, a severe storm could impact more than one transmission line. Additionally, other utilities have had to implement safety power shutoffs during high heat and high wind conditions to help mitigate the risk of wildfires.

O&R's initial assessment of the poles in service today indicates that the average pole is 60-70 years old. For reference, a western red cedar pole can last 50-60 years and many poles are approaching their time for lifecycle replacement – especially in light of the potential for the climate change effect of more frequent severe storms. O&R will be implementing the pole replacement program with prioritization for areas with known environmental impacts, as well as the age of the poles.

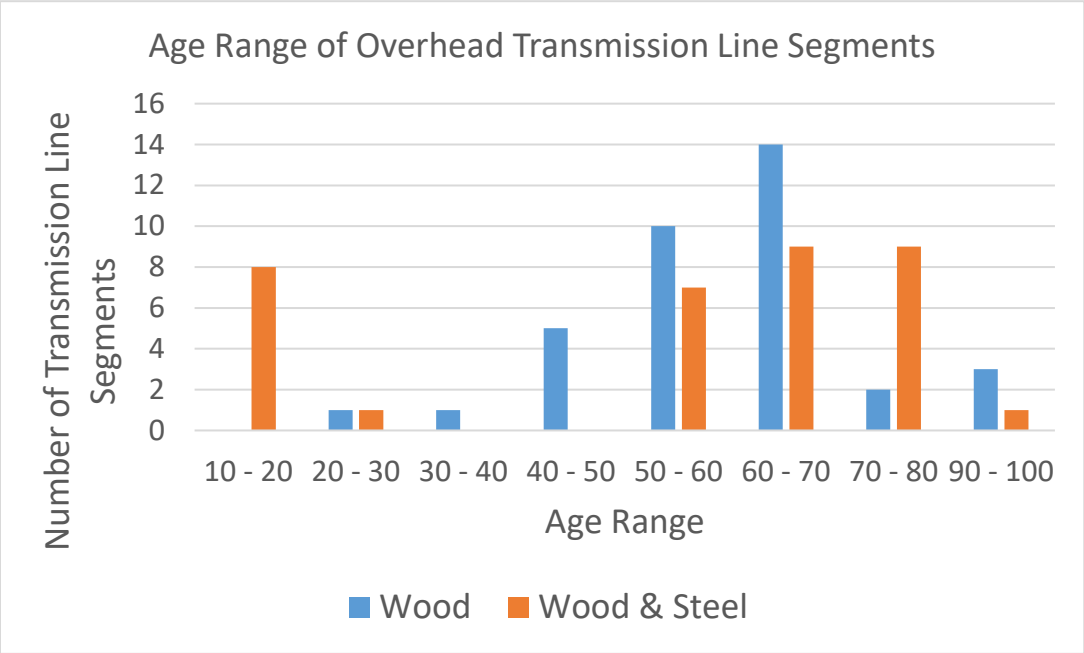


Figure 1. Age distribution of O&R's overhead transmission structures for wood poles and steel structures by number of transmission line segments.

Relying solely on the current state of O&R's overhead structures, without upgrades, exposes aging structures to intensifying climate risks. Ice accumulation on transmission towers and lines can result in transmission line failure. The risk intensifies when ice accumulation is accompanied by heavy winds. While minimum overhead transmission assets are designed to withstand winds up to 100 mph, climate projections indicate that more intense and stronger wind gusts in the O&R service territory are possible.

Projections indicate an increase in freezing rain frequency and ice thickness in New York with greater ice accumulation on vertical surfaces due to enhanced surface wind speeds during cold seasons, which could have implications for overhead structures. Even in the absence of ice, aging existing structures will be more susceptible to damage during extreme weather events such as hurricanes and thunderstorms, which also may increase in severity and frequency, illustrated by recent storms such as Hurricane Ida and Superstorm Sandy. Such vulnerabilities can lead to equipment failures, resulting in power disruptions and potentially compromising both the reliability and lifespan of the assets.

Specifically, inaction could lead to increased restoration costs and more extended system outages, impacting the communities O&R serves and placing additional financial and operational burdens on the Company. While O&R may need to replace the impacted poles proactively prior to a Commission decision on this resiliency filing, the situation is illustrative of potential climate change impacts on physical infrastructure such as transmission structures.

The vulnerability of aging transmission poles to severe weather events creates risks for O&R as well as O&R customers. The challenge for justifying the more proactive approach for pole replacement is the unknown factor of risk. An aging pole may indeed have another 20 years of useful life. However, a severe storm could hit that area at any time and cause damage to the pole. This unknown variable of when and where a storm will happen affects the likelihood aspect of a risk assessment that attempts to account for both the likelihood of an event occurring, as well as the impact from the event occurring. In this instance, a more proactive age-based pole replacement program is addressing the impact side of the risk assessment where the modern pole will be more resilient to the storm event if it occurs. While there is redundancy in the transmission pathways for electricity, a severe storm could impact more than one transmission line. Additionally, other utilities have had to implement safety power shutoffs during high heat and high wind conditions to help mitigate the risk of wildfires.

The Overhead Structure Replacement Program will consider steel structure replacements instead of wood due to increased wildfire risk in the future. Some studies suggest that lightning and thunderstorms could increase in the O&R service territory as global mean temperatures continue to warm. Additionally, drought can increase the likelihood of fire weather (dry and hot weather conditions) and drier vegetation conditions. Models project drier environment in the Northeastern United States due to future temperature increases, potentially increasing wildfire risk in the O&R service territory (see figure below).

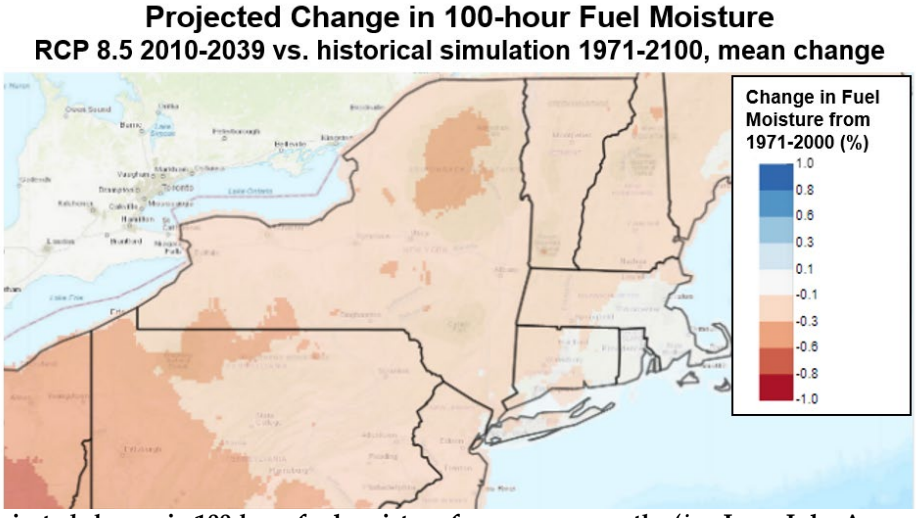


Figure 2. Projected change in 100-hour fuel moisture for summer months (*i.e.*, June, July, August) under RCP 8.5 between 2010-2039 and 1971-2000 using a multi-model mean derived from 18 downscaled CMIP5 models.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

Impact on Disadvantaged Communities

This program has been identified as a measure to mitigate climate-related risks across the O&R system based on potential system vulnerabilities, agnostic to customer demographics. This program will

benefit all customers served by facilities included in-scope, including customers in Disadvantaged Communities (DACs).

Impact on Greenhouse Gas (GHG) Emissions

A resilient transmission system is integral to the State of New York's efforts to transition from fossil fuel generation and achieve GHG emission reduction goals.

Impact on Clean Energy Commitment

The Overhead Structure Replacement program supports Initiative 2 under Pillar 1 of the Clean Energy Commitment, Build the Grid of the Future.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
Whenever possible, EHV will repair and modify deficient structures to delay the large capital cost of replacement. Repair and modification methods that the Company typically evaluates include filling/patching holes, wood cross arm replacement, wood cross arm reinforcement, hanger arm replacement and arm/insulator reframing. When feasible, the Company employs a lower cost capital expenditure method of reinforcing the poles utilizing C-Trussing. Structures that cannot be repaired, modified or reinforced are prioritized for replacement. This program will be targeting structures that do not fit within these repair criteria.

Risk of No Action

Risk
If this program is not implemented, O&R would continue the inspection-based program. No action and a failure of these structures can lead to a loss of the lines. The system would be required to resort to load shedding to relieve the overloads and prevent further line outages. The no action alternative could result in further degradation of reliability to electric service, as well as an increase in overload of the transmission system. Repair after structural failure would come at a significant additional cost compared to proactive measures to correct the issue.

Non-Financial Benefits

This project will provide non-financial benefits by improving safety for both the public and Company employees and contractors and supporting a more reliable power delivery system for the communities O&R serves.

By investing in the overhead structure replacement program, O&R not only fortifies its own transmission assets, reducing maintenance costs and minimizing unplanned repair expenditures, but also delivers tangible benefits to its customers. Interruptions or outages in the transmission system result in fewer pathways for the renewable generation to reach customers, including DACs. More resilient infrastructure means fewer service interruptions and an overall enhanced customer experience. It will also result in reduced risk of pole collapse and result in fewer on-site repairs, which will lessen potential safety hazards to both the public and O&R's employees and contractors.

With the Company's installation of steel structures, the risk of a line outage due to wildfire will be greatly reduced.

Summary of Financial Benefits and Costs

1. Cost:

The total cost of this project is $19,760,000.

2: Benefits:

In addition to the primary benefits described in the Justification Summary and Non-Financial Benefit sections, this program would also avoiding the cost of emergency repairs to a damaged structure , which can cost significantly more than a normal replacement.

2. Basis for estimate

The cost of installing an overhead steel structure ranges from $605,000 to $860,000 depending on difficulty of site access. Below is a table with cost detail:

Description	Unit	Unit Cost (Easy Access)	Unit Cost (Difficult Access)
Single (1) Structural Steel Pole Construction			
Design & Geotech Investigation	EA	$ 100,000	$100,000
Structural Steel Pole – Material	EA	$125,000	$125,000
Access and Site Location – Civil Work	EA	$50,000	$300,000
Caisson Foundation	EA	$125,000	$125,000
Rigging Work	EA	$40,000	$40,000
Conductor / OPGW Work	EA	$60,000	$60,000
Removal - Existing Pole	EA	$40,000	$40,000
Construction Management	EA	$60,000	$60,000
AFUDC	EA	$ 5,000	$10,000
TOTAL		$605,000	$860,000

The cost of installing an overhead wood pole structure ranges from $110,000 to $335,000 depending on difficulty of site access. Below is a table with cost detail:

Description	Unit	Unit Cost (Easy Access)	Unit Cost (Difficult Access)
Single (1) Wood Pole Construction			
Design & Geotech Investigation	EA	$ 10,000	$10,000
Wood Pole – Material	EA	$15,000	$15,000
Access and Site Location – Civil Work	EA	$25,000	$250,000
Caisson Foundation	EA	$10,000	$10,000
Rigging Work	EA	$15,000	$15,000
Conductor / OPGW Work	EA	$20,000	$20,000
Removal - Existing Pole	EA	$5,000	$5,000
Construction Management	EA	$10,000	$10,000
AFUDC	EA	$ -	$ -
TOTAL		$110,000	$335,000

Project Risks and Mitigation Plan

Risk	Mitigation plan
Length of permitting process could delay the overall project schedule.	Timely submissions and responses in regard to permit applications and questions/comments/concerns submitted by permitting entities.

Technical Evaluation / Analysis

Please refer to the climate change data and analysis in the justification summary.

Project Relationships (if applicable)

Project relationships are not applicable.

3. Funding Detail ($000)

2019-2024 Actual/Forecast Spend*

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Forecast 2023	Forecast 2024
O&M	-	-	-	-	-	-
Capital	**$1,523**	**$477**	**$2,020**	**$1,335**	**$1,605**	**$700**

Capital dollars do not include the CSX Brush Fire Project.

2025-2029 Request:

Total Request by Year:

	Request 2025	Request 2026	Request 2027	Request 2028	Request 2029
O&M	**$0**	**$0**	**$0**	**$0**	**$0**
Capital (Total)	**$2,250**	**$3,090**	**$3,978**	**$4,917**	**$5,909**
Labor	$302	$415	$534	$660	$793
M&S	$396	$544	$700	$866	$1,040
Contract Svcs.	$1,134	$1,557	$2,005	$2,478	$2,978
Other	$23	$32	$41	$50	$61
Overheads	$395	$542	$698	$863	$1,037

Long Range Funding Projections

	2030-2034	2035-2039	2040-2044
O&M	**$0**	**$0**	**$0**
Capital	**$32,040**	**$35,720**	**$39,830**
Basis for funding direction:	Annual inflation-related increases estimated (2.2%)	Annual inflation-related increases estimated (2.2%)	Annual inflation-related increases estimated (2.2%)

Explanation of Long Range Funding Projections:
The Company developed cost estimates for this program through 2029. For years 2030-2044, estimated cost represents similar replacement level as 2029 going forward and was escalated by 2.2% for inflation.

Enhanced Overhead System

Enhanced Overhead Program

Electric Engineering

1. Project / Program Summary

Type: ☐ Project ☒ Program	**Category: ☒ Capital ☒ O&M**
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Enhanced Overhead Program	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1): Various**
Status: ☐ Initiation/Planning ☐ In-Progress (Projects Only) ☒ On-going (Programs Only)	
Estimated Start Date: Q1 2025	**Estimated Date In Service: Q4 2029**
2025-2029 Funding Request ($000) **Capital: $72,890** **O&M: $10,450**	

Work Description:

Climate projections show that extreme events such as storms will likely become more frequent in Orange and Rockland Utilities, Inc.'s (O&R or the Company) service territory over the coming decades. To mitigate this risk, the installation of spacer cable systems will advance overall system resilience by reinforcing the distribution overhead lines to external environmental hazards, reducing maintenance costs over the long-term, and minimizing potential service interruptions caused by climate hazards. This program will expand O&R's current level of installation of spacer cable (e.g., Hendrix cable) in the overhead distribution system. These systems will advance overall system resilience by reinforcing the distribution overhead lines to external environmental hazards, reducing maintenance costs over the long-term, and minimizing potential service interruptions caused by climate hazards.

Spacer cable is designed for high reliability and tree contact resistance. It is also compact to reduce tree trimming clearances. The conductors are covered with two layers of polymer design to allow intermittent tree contacts without causing an outage or nuisance tripping. The conductors are supported by a high strength messenger, which provides mechanical support, serves as a system neutral, and acts as a shield wire against lightning. This Enhanced Overhead Program will improve the reliability of the O&R overhead distribution system during storm events and will provide an alternate path in the event of a contingency issue, especially in areas characterized by equipment failure and aging infrastructure.

The six projects below have individual project white papers for these projects because they met the Company's standard procedure for white paper development (i.e, budgets in excess of $1,000,000 for one year or $2,000,000 within two consecutive years within the Company's next planned rate case period).

L1/Project	Footage (ft)	Cost ($000)	Year
25364097 – Sparkill – Ferdon – Rockland Rd	4,500	$1,500.7	2025
25386806 – Goshen – Old Chester Rd. Heritage Est	7,300	$1,201.0	2027

26178068 – Mongaup – Mill Road	9,000	$1,500.7	2025
26178077 – Monsey – Ralph to Jill Lane to Rita	5,200	$1,201.0	2027
26178107 – Blooming Grove – Helms Rd & Mountain Lodge Rd	6,500	$1,500.7	2025
26351219 – Upper Nyack – Boardway Castle Height	6,200	$1,100.0	2027
Totals	**38,700**	**$8,004.1**	

The projects below have been identified but are not covered by individual white paper since they do not meet the Company's standard procedure for white paper development.

L1 / Project	Footage (ft)	Cost ($000)	Year
23955987 – Goshen – Pulaski Highway (Part 2)	500	$700.1	2027
23291944 - 2023 Suffern-Grandview (Forshay To Spook Rock)	5,000	$700.0	2028
23292072 - 2023 Pine Island-Pulaski Highway Close Gap Goshen	7,000	$1,200.1	2028
23291893-Piermont - Rt 9w	4,800	$800.9	2025
23291950-Suffern Hilltop Rd 4kv conversion	3,900	$650.6	2026
23900364 - Tallman - Cherry Lane – Hendrix	4,100	$650.1	2025
25364100 - Spring Valley-S Pascack Rd	3,900	$800.4	2025
25386812 - Grandview - Rt 9w	5,200	$950.4	2026
26178065 - Stony Point - Beach Road & E Main Street	2,300	$400.0	2027
26178066 - Piermont - Ash Street	1,000	$350.7	2027
26178069 - Central valley - Smith	3,200	$500.2	2027
26178070 - Forestburg - French Clearing Road	8,800	$1,300.2	2028
26178072 - Washingtonville - Goshen Ave (RT-208)	8,400	$1,700.2	2028
26178074 - Forestburg - Sackett lake Rd	6,000	$880.3	2028
26178075 - Spring Valley - Buena Vista & Karnel	1,700	$550.0	2026
26178076 - Blooming Grove - Mtn Lodge Rd & Perry Creek	4,000	$801.0	2025
27141316 - Goshen - Cheechunk Rd. 6 1/2 Station Road to Owens Rd	7,000	$1,100.7	2028
27141318 - Spring Valley - Viola Road (by-pass)	1,700	$350.9	2027
27141319 - Pomona - Camp Hill Rd - (SH)	2,500	$980.1	2027
23900377 - Goshen - Pulaski Highway (Part 1)	6,300	$700.1	2026
27141313 - Mongaup - Plank Road	2,100	$350.1	2026
2029 Program	33,300	$6,000.0	2029
Totals	**122,700**	**$22,417.1**	

Additionally, the Enhanced Overhead Program has a target for reinforcing an additional 45 miles of overhead distribution line over the near term (2025-29) at a cost of $52,923,000, which includes additional O&M to transfer of equipment from existing poles to the new pole includes but limited to transformers, cut-outs, secondary wiring. This additional 45 miles will be targeting the worst-performing circuits and the planning process will consider equity (*i.e.*, disadvantaged communities) for project development. Beyond 2029, the Company plans to continue to enhance its overhead distribution lines by approximately 13 miles per year. The estimated program costs beyond 2029 are shown in the Long-Range Funding Projections table at the end of this white paper.

This resiliency program is proposed as a storm hardening measure in the Climate Change Resilience Plan filing, as required by Public Service Law (PSL) § 66(29); PSC Case 22-E-0222.

Justification Summary:

Projections indicate that the O&R service territory will experience more intense storms in the future, emphasizing the importance of this program to reduce the number and duration of outages. Strong winds and ice accumulation can cause trees and tree limbs to fall, which can lead to contact with electric equipment, lines, and structures, potentially resulting in widespread outages and the cable system investments proposed decrease the Company's risk of those such outages occurring. Emergency response times may also be delayed if access to assets is hindered by downed trees from heavy precipitation, wind, and other extreme events.

Severe rain events can cause soft soil conditions which can increase likelihood of trees to fall down. Projections show that the number of days per year with more than 2 inches of rain could increase by 45% by 2050 and 77% by 2080 at Dobbs Ferry. O&R is also likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future and the potential exists for increased radial icing intensity. Furthermore, North Atlantic hurricanes are projected to become more intense (~5% increase) and have higher rainfall amounts (~10%-15% increase) relative to historical hurricanes. Projections indicate an increase in freezing rain frequency and ice thickness in New York with greater ice accumulation on vertical surfaces due to enhanced surface wind speeds during cold seasons Thus, it is essential to implement these storm hardening practices to improve the resiliency of the O&R system.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project is in alignment with the Company's goals to increase resiliency and reliability, meet current design standards, and upgrade aging infrastructure.

Impact on Disadvantaged Communities

This project has been identified as a measure to mitigate climate-related risks across the O&R system based on potential system vulnerabilities, agnostic to customer demographics. This project will benefit all customers served by facilities included in-scope, including customers in Disadvantaged Communities.

Impact on Greenhouse Gas (GHG) Emissions

There is no direct impact on GHG emissions.

Impact on Clean Energy Commitment

The Enhanced Overhead Program supports Initiative 2 under Pillar 1 of the Clean Energy Commitment, Build the Grid of the Future.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
Undergrounding is a potential alternative to the Enhanced Overhead Program. However, for specific projects under this program, the Company would not consider underground construction due to excess cost to the Company and its customers (*e.g.*, areas with primary overhead distribution with numerous customer connections). In other cases, undergrounding at specific locations is not feasible.

Alternative 2 description and reason for rejection
O&R also did not consider armless or cross arm construction due to the fact that these systems do not provide extra protection from lightning strikes or any added resistance to tree contacts.

Risk of No Action

Risk
If no action is taken, during storm conditions, the probability exists that radial circuits identified within this program would be lost for any tree related outage or a major vehicle accident on any single pole. This would leave the customers served by those circuits without service until O&R completes the necessary repairs.

Non-Financial Benefits

The new reinforced spacer cable system overhead circuit will provide a back feed, thereby providing resiliency benefits while maintaining system reliability to the surrounding area. Therefore, this project will help avoid customer service outages during emergency events.

Summary of Financial Benefits and Costs

1. Cost:

Please refer to the Work Description section for costs.

2. Benefit:

The primary benefits of this program are as described in the Justification Summary and Non-Financial Benefits sections above. Additionally, this program might be able to lower emergency restoration cost.

2. Basis for estimate

Historical capital expenditures of similar overhead distribution projects.

Project Risks and Mitigation Plan

Risk 1	Mitigation plan
Length of permitting process could delay the overall project schedule.	Timely submissions and responses in regard to permit applications and questions/comments/concerns submitted by permitting entities.

Risk 2 Mitigation plan

Technical Evaluation / Analysis Please refer to the climate change data and analysis in the Justification Summary above.
Project Relationships (if applicable) Project relationships are not applicable.

3. Funding Detail ($000)

2019-2024 Actual/Forecast Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Forecast 2023	Forecast 2024
O&M						
Capital						

2025-2029 Request:
Total Request by Year:

	Request 2025	Request 2026	Request 2027	Request 2028	Request 2029
O&M	**$2,000**	**$2,044**	**$2,089**	**$2,135**	**$2,182**
Capital (Total)	**$15,555**	**$11,441**	**$15,271**	**$15,623**	**$15,004**
Labor	$5,600	$4,119	$5,498	$5,624	$5,402
M&S	$3,733	$2,746	$3,665	$3,750	$3,601
Contract Svcs.	$1,556	$1,144	$1,527	$1,562	$1,500
Other	$0	$0	$0	$0	$0
Overheads	$4,666	$3,432	$4,581	$4,687	$4,501

Long Range Funding Projections

	2030-2034	2035-2039	2040-2044
O&M	**$11,650**	**$12,990**	**$14,480**
Capital	**$58,740**	**$65,490**	**$73,020**
Basis for funding direction:	Annual inflation-related increases estimated (2.2%)	Annual inflation-related increases estimated (2.2%)	Annual inflation-related increases estimated (2.2%)

Explanation of Long Range Funding Projections: The Company developed cost estimates for this program through 2029. For years 2030-2044, estimated cost represents similar overhead enhancement level as 2029 going forward and was escalated by 2.2% for inflation.

Sparkill-Ferdon-Rockland Rd. Hendrix New tie 50-2 Project

Electric Engineering

1. Project / Program Summary

Type: ☒ **Project** ☐ **Program**	**Category:** ☒ **Capital** ☐ **O&M** ☐ **Regulatory Asset**
Work Plan Category: ☐ **Regulatory Mandated** ☐ **Operationally Required** ☐ **Strategic**	
Project/Program Title: Sparkill-Ferdon-Rockland Rd. Hendrix New tie 50-2 Project	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1):** 25364097
Status: ☐ **Initiation/Planning** ☐ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: January 2025	**Estimated Date In Service:** December 2025
2024-2028 Funding Request ($000) **Capital:** $1,500.7 **O&M:**	

Work Description:

This project will provide load relief to circuit 50-3-13 in Sparkill New York. Currently, circuit 50-3-13 fails Orange and Rockland Utilities, Inc.'s ("O&R" or the "Company") distribution design criteria, as the circuit is approaching conductor thermal relief ratings (475amps). This requires the feeder to be restored within two pairs of field switching moves to adjacent circuits, and the current field conditions limit the restoration of customers. This project requires the installation of 4,500 feet of 477aac Hendrix Spacer Cable to provide load relief for circuit 50-3-13. This project will address poor system reliability of the local distribution system along Ferdon Avenue and Rockland Road. It will address aging infrastructure, increase capacity and storm harden the distribution system. This project will upgrade existing three-phase #2/0 cu and #4 cu three-phase construction with three-phase 477 aac Hendrix Spacer Cable with 0052 AWA messenger. O&R will upgrade approximately 4,500 feet of conductor.

This project will establish a new three-phase mainline circuit path along Ferdon Avenue and Rockland Road in Sparkill, NY for circuit 50-2-13, which will provide load relief. This project meets all Company distribution design criteria to provide relief for circuit 50-3-13 and meets emergency contingency conditions.

This project will start on Ferdon Avenue at C/O pole# 61494/37811 and end on Rt 9W in Sparkill (approximately 4500 feet). This project will establish a new 13.2kV, three phase mainline circuit path along Ferdon Avenue and Rockland Road in Sparkill, NY. This new mainline conductor will become the new mainline path for circuit 50-2-13. After this project is completed, the Company will reconfigure circuits 50-3-13, 50-2-13, and 50-1-13. This project will include distribution automation (*i.e.*, Recloser and (2) Motor Operated Air Breaks that will be Supervisory Control and Data Acquisition commissioned upon completion.

As reported in O&R's 2022 NY Eastern Division Worst Performing Circuits, circuit 50-3-13 ranks 13th out of 104 Eastern NY distribution circuits. This project will improve reliability issues associated with the overhead distribution system during storm events. The Overhead Hendrix Project will provide an alternate path in the event of a contingency issue. The area is characterized by equipment failure and aging infrastructure.

Undergrounding this portion of the circuit will not resolve the underlying issues, as most of the customers in the area are served with overhead service drops. This project will improve reliability and provide an alternate path to reroute a portion of circuit 50-3-13 that is most prone to damage.

Justification Summary:

This project will storm harden the local distribution system and establish a new circuit path on Ferdon Avenue and Rockland Road in Sparkill. Circuit 50-3-13 serves 900 customers. This project will replace approximately 4,500 feet of overhead distribution with Hendrix Spacer Cable. Upon completion of this project, O&R will reconfigure circuits 50-2-13 and 50-3-13. This project will improve reliability issues associated with the overhead distribution system during storm events.

In total, 2,996 customers (circuit 50-2-13 – 2,096 customers and circuit 50-3-13 - 900 customers) will benefit with this project. During past multiple events, the area served by both circuits has been damaged multiple times, resulting in large scale outages.

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in the O&R's Climate Change Vulnerability Study (filed September 2023, in NYPSC Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

Strong winds and ice accumulation can cause trees and tree limbs to fall, which can lead to contact with electric equipment, lines, and structures, potentially resulting in widespread outages and the cable system investments proposed decrease the Company's risk of those such outages occurring. Emergency response times may also be delayed if access to assets is hindered by downed trees from heavy precipitation, wind, and other extreme events.

Severe rain events can cause soft soil conditions which can increase the likelihood of trees falling down. Projections show that the number of days per year with more than 2 inches of rain could increase by 45% by 2050 and 77% by 2080 at Dobbs Ferry. The O&R service territory is also likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future and the potential exists for increased radial icing intensity. Furthermore, North Atlantic hurricanes are projected to become more intense (~5% increase) and have higher rainfall amounts (~10%-15% increase) relative to historical hurricanes. Projections indicate an increase in freezing rain frequency and ice thickness in New York State with greater ice accumulation on vertical surfaces due to enhanced surface wind speeds during cold seasons Thus, it is essential to implement these storm hardening practices to improve the resiliency of the O&R system.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project does not directly impact greenhouse gas emissions.

This project is in alignment with our goals to increase reliability through storm hardening, meet design standards, and upgrade aging infrastructure. In addition, the project addresses Corporate risk for Major Storms by providing storm hardening benefits.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
O&R completed a detailed review to identify potential overhead alternative routes. However, no options are available. This project will benefit local customers. The underground distribution dip is the only solution. In total, 2,703 customers will benefit with this selective underground storm hardening project, and it will improve public safety.

Risk of No Action

Risk 1
If no action is taken, during storm conditions, the probability exists that this radial circuit would be lost for any tree related outage or a major vehicle accident on any single pole. This will leave those customers affected without service until O&R can complete the necessary repairs.

Non-Financial Benefits
The new reinforced spacer cable system overhead circuit will provide a back feed, thereby maintaining system reliability and providing additional storm hardening benefits to the surrounding area.

Summary of Financial Benefits and Costs (attach backup)
1. Cost-benefit analysis
See Enhanced Overhead Program for more information.
2. Major financial benefits
See Enhanced Overhead Program for more information.
3. Basis for estimate
Historical capital expenditures of similar overhead distribution projects.

Project Risks and Mitigation Plan

Risk 1	Mitigation plan
Length of permitting process could delay the overall project schedule.	Timely submissions and responses in regard to permit applications and questions/comments/concerns submitted by permitting entities.

Technical Evaluation / Analysis

N/A

Project Relationships (if applicable)

N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital						

2024-2028 Request:
Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)		$1,500.7			
Labor		$540.3			
M&S		$360.1			
Contract Svcs.		$150.1			
Other					
Overheads		$450.2			

Goshen - Old Chester Rd. Heritage Estates to Goshen Training Center Project

Electric Engineering

1. Project / Program Summary

Type: ☒ **Project** ☐ **Program**	**Category:** ☒ **Capital** ☐ **O&M** ☐ **Regulatory Asset**
Work Plan Category: ☐ **Regulatory Mandated** ☒ **Operationally Required** ☐ **Strategic**	
Project/Program Title: Goshen - Old Chester Rd. Heritage Estates to Goshen Training Center Project	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1):** 25386806
Status: ☒ **Initiation/Planning** ☐ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: January 2027	**Estimated Date In Service:** June 2027
2024-2028 Funding Request ($000) **Capital:** $1,250.0 **O&M:**	

Work Description:

This project will reconductor three-phase distribution along Old Chester Road between Goshen and Chester NY, and between South Street and Duck Farm Road with 477aac three-phase overhead Hendrix construction. This project will convert a portion of Old Chester Road from 2.4kV to 13.2kV and will install a total of 7,300 feet of three-phase Hendrix. This project also includes the installation of two (2) Motor Operated Air Breaks to assist with isolation and restoration.

In 2029, O&R will construct a new Goshen Substation and retire the existing Goshen Substation. This new substation will include eight (8) new 13.2kV distribution circuits that will serve the Goshen area. Currently circuit 89-1-13 serves 1,600 customers, including multiple office and community buildings. With the new design, the circuit will be reconfigured, and a portion of the existing circuit will be split and connected to a new circuit. This new circuit will serve approximately 800 customers and enhance O&R's ability to serve Legoland and provide additional support for Chester circuit 63-4-13. This project will address poor system reliability of the local distribution system, address aging infrastructure, improve voltage in the area to meet ANSI C84.1 range "A" voltage requirements. It also will increase the capacity of and storm harden the distribution system. Upon completion, a new main line distribution tie between Goshen Substation and the Chester Substation will be established. This project also includes a 2.4kV/13.2kV conversion.

Hendrix Spacer Cable is designed for high reliability, tree contact resistance, and compact to reduce tree trimming clearances. The conductors are covered with two layers of polymer designed to allow intermittent tree contacts without causing an outage or nuisance tripping. The conductors are supported by a high strength messenger which provides mechanical support, serves as a system neutral, and acts as a shield wire against lightning.

During storm events, past mature trees in the area have damaged area overhead distribution systems, resulting in large scale outages. This area has experienced multiple outages due to weather, vegetation contact, and animal contact. This project will reduce future outages, enhance overall resiliency and have a positive impact on the reliability for local customers.

Justification Summary:

This project aligns with Company goals to increase reliability through storm hardening, meet current design standards, and upgrade aging infrastructure. This project addresses corporate risk from major storms by providing storm hardening benefits.

This project will address poor system reliability of the local distribution system, address aging infrastructure, increase conductor capacity, improve voltage conditions, storm harden the distribution system and establish a future distribution tie with Chester distribution circuit 63-4-13. This area consistently experiences multiple outages each year due to lightning or equipment failure. Reconductoring with Hendrix Spacer Cable will storm harden the system and allow for a future 13.2kV conversion from 2.4kV.

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in the O&R's Climate Change Vulnerability Study (filed September 2023, in NYPSC Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

Strong winds and ice accumulation can cause trees and tree limbs to fall, which can lead to contact with electric equipment, lines, and structures, potentially resulting in widespread outages and the cable system investments proposed decrease the Company's risk of those such outages occurring. Emergency response times may also be delayed if access to assets is hindered by downed trees from heavy precipitation, wind, and other extreme events.

Severe rain events can cause soft soil conditions which can increase the likelihood of trees falling down. Projections show that the number of days per year with more than 2 inches of rain could increase by 45% by 2050 and 77% by 2080 at Dobbs Ferry. The O&R service territory is also likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future and the potential exists for increased radial icing intensity. Furthermore, North Atlantic hurricanes are projected to become more intense (~5% increase) and have higher rainfall amounts (~10%-15% increase) relative to historical hurricanes. Projections indicate an increase in freezing rain frequency and ice thickness in New York State with greater ice accumulation on vertical surfaces due to enhanced surface wind speeds during cold seasons Thus, it is essential to implement these storm hardening practices to improve the resiliency of the O&R system.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project does not directly impact greenhouse gas emissions.

This project is in alignment with the Company's goals to increase reliability through storm hardening, meet design standards, and upgrade aging infrastructure. In addition, the project addresses Corporate risk for Major Storms by providing storm hardening benefits.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
The Company did not consider underground construction due to the area being primarily overhead distribution with numerous customer connections. Undergrounding would require significant additional cost for the Company and customers. O&R did not consider underground distribution on Old Chester Road, as the area is predominately an overhead distribution system. O&R also did not consider armless or cross arm construction due to the area's suffering from severe lightning strikes. O&R concluded that Hendrix Spacer Cable construction is the preferred designed.

Risk of No Action

Risk 1
If no action is taken, during storm conditions, the probability exists that this radial circuit would be lost for any tree related outage or a major vehicle accident on any single pole. This will leave affected customers out of service until O&R completes necessary repairs.

Non-Financial Benefits
The new reinforced spacer cable system overhead circuit will provide a back feed, thereby maintaining system reliability and providing additional storm hardening benefits to the surrounding area.

Summary of Financial Benefits and Costs (attach backup)
1. Cost-benefit analysis
See Enhanced Overhead Program for more information.
2. Major financial benefits
See Enhanced Overhead Program for more information.
3. Basis for estimate

Historical capital expenditures of similar overhead distribution projects.

Project Risks and Mitigation Plan

Risk 1	Mitigation plan
Length of permitting process could delay the overall project schedule.	Timely submissions and responses in regard to permit applications and questions/comments/concerns submitted by permitting entities.

Technical Evaluation / Analysis

N/A
Project Relationships (if applicable) N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital						

2024-2028 Request:
Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)				$1,250.0	
Labor				$450.0	
M&S				$300.0	
Contract Svcs.				$125.0	
Other					
Overheads				$375.0	

Mongaup - Mill Road (Station to Cty Rt 43) 9,000ft - 2-1-13 Project

Electric Engineering

1. Project / Program Summary

Type: ☒ **Project** ☐ **Program**	**Category:** ☒ **Capital** ☐ **O&M** ☐ **Regulatory Asset**
Work Plan Category: ☐ **Regulatory Mandated** ☒ **Operationally Required** ☐ **Strategic**	
Project/Program Title: Mongaup - Mill Road (Station to Cty Rt 43) 9,000ft - 2-1-13 Project	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1): 26178068**
Status: ☒ **Initiation/Planning** ☐ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: January 2025	**Estimated Date In Service:** December 2025
2024-2028 Funding Request ($000) **Capital:** $1,500.7 **O&M:**	
Work Description:	

This project will require reconductoring of the three-phase distribution along Plank and Mill Road in Mongaup, NY with 477aac three-phase overhead Hendrix Spacer Cable. This project will storm harden the area between Orange and Rockland Utilities, Inc.'s ("O&R" or the "Company") Mongaup Substation and Rt 42. In total, O&R will install 9,000 feet of three-phase Hendrix Spacer Cable.

Hendrix Spacer Cable is designed for high reliability and tree contact resistance. It is also compact to reduce tree trimming clearances. The conductors are covered with two layers of polymer design to allow intermittent tree contacts without causing an outage or nuisance tripping. The conductors are supported by a high strength messenger, which provides mechanical support, serves as a system neutral, and acts as a shield wire against lightning.

During storm events, aging trees in the area have damaged overhead distribution systems, resulting in large scale outages. The area has experienced multiple outages due to weather, vegetation contact, and animal contact. This project will help reduce future outages, enhance overall resiliency, and have a positive impact on the reliability for local customers.

Justification Summary:

This project is in alignment with Company goals to increase reliability through storm hardening, meet current design standards, and upgrade aging infrastructure. The project addresses corporate risk from major storms by providing storm hardening benefits.

This project will address poor system reliability of the local distribution system, address aging infrastructure, increase conductor capacity, improve voltage conditions, and storm harden the distribution system. The area consistently experiences multiple outages each year due to lightning or equipment failure.

In the future, with the Mongaup Substation upgrade, O&R will install four additional underground mainline circuits. The Mongaup Substation will be upgraded with a two (2) bank station 25mva. Currently, the station is a single bank station with one (1) – 7.5MVA, 69/13.2kV transformer that supplies one 13.2kV distribution circuit (2-1-13).

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in the O&R's Climate Change Vulnerability Study (filed September 2023, in NYPSC Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

Strong winds and ice accumulation can cause trees and tree limbs to fall, which can lead to contact with electric equipment, lines, and structures, potentially resulting in widespread outages and the cable system investments proposed decrease the Company's risk of those such outages occurring. Emergency response times may also be delayed if access to assets is hindered by downed trees from heavy precipitation, wind, and other extreme events.

Severe rain events can cause soft soil conditions which can increase the likelihood of trees falling down. Projections show that the number of days per year with more than 2 inches of rain could increase by 45% by 2050 and 77% by 2080 at Dobbs Ferry. The O&R service territory is also likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future and the potential exists for increased radial icing intensity. Furthermore, North Atlantic hurricanes are projected to become more intense (~5% increase) and have higher rainfall amounts (~10%-15% increase) relative to historical hurricanes. Projections indicate an increase in freezing rain frequency and ice thickness in New

York State with greater ice accumulation on vertical surfaces due to enhanced surface wind speeds during cold seasons Thus, it is essential to implement these storm hardening practices to improve the resiliency of the O&R system.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project does not directly impact greenhouse gas emissions.

This project is in alignment with our goals to increase reliability through storm hardening, meet design standards, and upgrade aging infrastructure. In addition, the project addresses Corporate risk for Major Storms by providing storm hardening benefits.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

O&R did not consider armless or cross arm construction due to the very heavy vegetation and the fact that the area is prone to lightning strikes. Hendrix Spacer Cable construction is the preferred designed.

Risk of No Action

Risk 1
If no action is taken, during storm conditions, the probability exists that this radial circuit would be lost for any tree related outage or a major vehicle accident on any single pole. This will leave affected customers without service until O&R completes the necessary repairs.

Non-Financial Benefits

The new reinforced spacer cable system overhead circuit will provide a back feed, thereby maintaining system reliability and providing additional storm hardening benefits to the surrounding area.

Summary of Financial Benefits and Costs (attach backup)
1. Cost-benefit analysis
See Enhanced Overhead Program for more information.
2. Major financial benefits
See Enhanced Overhead Program for more information.
3. Basis for estimate
Historical capital expenditures of similar Company overhead distribution projects.

Project Risks and Mitigation Plan

Risk 1	Mitigation plan
Length of permitting process could delay the overall project schedule.	Timely submissions and responses in regard to permit applications and questions/comments/concerns submitted by permitting entities.

Technical Evaluation / Analysis

N/A
Project Relationships (if applicable) N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital						

2024-2028 Request:
Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)		$1,500.7			
Labor		$540.3			
M&S		$360.2			
Contract Svcs.		$150.1			
Other					
Overheads		$450.1			

Monsey - Ralph to Jill La to Rita to Susanne to Howard - 5200 ft

Electric Engineering

1. Project / Program Summary

Type: ☒ **Project** ☐ **Program**	**Category:** ☒ **Capital** ☐ **O&M** ☐ **Regulatory Asset**
Work Plan Category: ☐ **Regulatory Mandated** ☒ **Operationally Required** ☐ **Strategic**	
Project/Program Title: Monsey - Ralph to Jill La to Rita to Susanne to Howard - 5200 ft	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1): 26178077**
Status: ☒ **Initiation/Planning** ☐ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: January 2027	**Estimated Date In Service:** June 2027
2024-2028 Funding Request ($000) **Capital:** $1,200.0 **O&M:**	
Work Description:	

This is a Storm Hardening Project to provide load relief for 1,000 customers served by Orange and Rockland Utilities, Inc. (O&R or the Company) from a set of three-phase C/O's and currently fails the design standard. The purpose of this project will be to install a new three phase mainline circuit tie between circuits 44-5A-13 & 44-4-13 between Ralph Lane and Howard Drive in Monsey, New York. This project will reconductor overhead system with 477AAC Hendrix path along Ralph Lane, Jill Lane, Susanne to Howard Drive. The purpose of this project will be to install a new three phase mainline circuit path along Ralph Lane and Howard Drive for the 44-5A-13 and circuit 44-4-13. The project will meet all Distribution Design criteria to provide relief for both circuits and will meet emergency contingency conditions.

This project requires reconducting from Ralph Lane to Jill Lane to Susanne to Howard Drive. The scope of this project includes re-conducting to mainline Hendrix construction (approximately 5,200ft) with 477AAC Hendrix with 052AWA spacer cable. This project will require the installation of new (2) MR Recloser and multiple Motor Operated Air Breaks (MOABs). This project will address aging infrastructure, improve overall system reliability, increase capacity and provide a new distribution path to install a new distribution circuit tie (44-5A-13 and 44-4-13). All existing secondary will be replaced with 4/0 triplex.

The Company's completion of this project, in addition to a second project planned for Howard Drive, will result in a new distribution flip-flop loop between circuit 44-5A-13 and 44-4-13. There is also a third project planned for Morris Road and Ralph Lane, and with the addition of the new Burns upgrade planned for 2025, the third project plan to result in a flip-flop loop between 44-5A-13, 44-4-13 and the new Burns circuit (at present, Burns circuit 19-10-13 fails planning criteria). This will assist with isolation and restoration. However, a more reliable source helps to back feed the circuit to assist in restoration. At the completion of all three projects, three circuits (44-5A-13, 44-4-13 and the new Burns circuit) will be reconfigured and will improve overall reliability and multiple reliable sources to this high-density area.

Undergrounding this portion of the circuit will not resolve the issues, as most of the customers in the area are served with overhead service drops. This project will improve reliability and provide an alternate path to reroute a portion of both circuits.

Justification Summary:

In total 2,300 customers (Ckt: 44-4-13 – 863 customers & 44-5A-13 - 1,433 customers) will benefit with this project. During past multiple events, this area of both circuits has been damaged has been damaged multiple times that resulted in large scale outages.

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in the O&R's Climate Change Vulnerability Study (filed in September 2023, Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, to include:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

Strong winds and ice accumulation can cause trees and tree limbs to fall, which can lead to contact with electric equipment, lines, and structures, potentially resulting in widespread outages and the cable system investments proposed decrease the Company's risk of those such outages occurring. Emergency response times may also be delayed if access to assets is hindered by downed trees from heavy precipitation, wind, and other extreme events.

Severe rain events can cause soft soil conditions which can increase the likelihood of trees falling down. Projections show that the number of days per year with more than 2 inches of rain could increase by 45% by 2050 and 77% by 2080 at Dobbs Ferry. The O&R service territory is also likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future and the potential exists for increased radial icing intensity. Furthermore, North Atlantic hurricanes are projected to become more intense (~5% increase) and have higher rainfall amounts (~10%-15% increase) relative to historical hurricanes. Projections indicate an increase in freezing rain frequency and ice thickness in New York State with greater ice accumulation on vertical surfaces due to enhanced surface wind speeds during cold seasons Thus, it is essential to implement these storm hardening practices to improve the resiliency of the O&R system.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project does not impact greenhouse gas emissions.

This project is in alignment with the Company's goals to increase reliability through storm hardening, meet design standards, and upgrade aging infrastructure. In addition, the project addresses Corporate risk for Major Storms by providing storm hardening benefits.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

Undergrounding this portion of the circuit will not resolve the issues, as most of the customers in the area are served with overhead service drops. This project will improve reliability and provide an alternate path to reroute a portion of both of both circuits.

Risk of No Action

Risk 1
If no action is taken, during storm conditions, the probability exists that this radial circuit would be lost for any tree related outage or a major vehicle accident on any single pole leaving these customers out of service until repairs are completed.

Non-Financial Benefits

The new reinforced spacer cable system overhead circuit will provide a back feed maintaining system reliability and providing additional storm hardening benefits to the surrounding area.

Summary of Financial Benefits and Costs (attach backup)
1. Cost-benefit analysis
See Enhanced Overhead Program for more information.
2. Major financial benefits
See Enhanced Overhead Program for more information.
3. Basis for estimate

Historical capital expenditures of similar overhead distribution projects.
Project Risks and Mitigation Plan

Risk 1	Mitigation plan
Length of permitting process could delay the overall project schedule.	Timely submissions and responses in regard to permit applications and questions/comments/concerns submitted by permitting entities.

Technical Evaluation / Analysis N/A
Project Relationships (if applicable) N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital						

2024-2028 Request:
Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)				$1,200.0	
Labor				$432.0	
M&S				$288.0	
Contract Svcs.				$120.0	
Other					
Overheads				$360.0	

Blooming Grove - Helms Hill Rd & Mtn Lodge Rd - 6500ft Hendrix Project

Electric Engineering

1. Project / Program Summary

Type: ☒ Project ☐ Program	**Category: ☒ Capital ☐ O&M ☐ Regulatory Asset**
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Blooming Grove - Helms Hill Rd & Mtn Lodge Rd - 6500ft Hendrix Project	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1): 26178107**

Status: ☒ **Initiation/Planning** ☐ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: January 2025	**Estimated Date In Service:** June 2025
2024-2028 Funding Request ($000) **Capital:** $1,500.7 **O&M:**	

Work Description:

This project will complete a new circuit path. Circuit 76-3-13 currently feeds 2,182 customers and circuit 76-4-13 currently feeds 1,227 customers. These circuits provide contingency support for one another. This is an overhead primary project to set new poles and install 6,500 feet of new Hendrix Spacer Cable to upgrade and convert Helms Hill Road to 13.2 kV in the Blooming Grove/Washingtonville area. The Company will schedule this project after the completion of the Round Hill Road project (2023). This construction will serve as the path for the new circuit 76-7-13 at the completion of the future Blooming Grove substation and two other projects on Mountain Lodge Road and Perry Creek Lane. It will also provide future backup for the new circuits 76-3-13 and 76-4-13. Construction will be Hendrix (477) with 052 AWA messenger spacer cable design. Upon completion of this project, the area will meet the Company's distribution design standards and provide backup for customers on Tuthill Road. With limited paths to this geographic area, this project is necessary for both reliability and contingency purposes. O&R did not consider underground construction due to the existing predominantly overhead distribution system in the area.

This project includes installing 6,500 feet of new three phase Hendrix (477) with 052 AWA messenger spacer cable design to improve system capacity, resiliency, and reliability to the area.

Hendrix Spacer Cable is designed for high reliability and tree contact resistance. It is also compact to reduce tree trimming clearances. The conductors are covered with two layers of polymer design to allow intermittent tree contacts without causing an outage or nuisance tripping. The conductors are supported by a high strength messenger, which provides mechanical support, serves as a system neutral, and acts as a shield wire against lightning.

Justification Summary:

This project is in alignment with the Company's goals to increase reliability through storm hardening, meet current design standards, and upgrading aging infrastructure. This project addresses corporate risk from major storms by providing storm hardening benefits.
This project will extend main line primary to create an additional circuit tie between existing circuits 76-3-13 and 76-4-13. In addition, it will serve as the path of future circuit 76-7-13 from the planned Blooming Grove substation to Helms Hill Road and circuit 76-3-13 to Clove Road. Upon completion of this project, the area will meet the Company's distribution design standards and provide backup for customers on Round Hill Road.

The additional load will be at the edge of the O&R service territory and will require a robust source and back feed along this path. In addition, the existing three-phase construction on Goshen Avenue is undersized and has poor system reliability of the local distribution system. The purpose of this project is to address aging infrastructure, increase conductor capacity, improve voltage conditions, storm harden the distribution system and establish a future distribution tie. This area consistently experiences multiple outages each year due to lightning or equipment failure. Reconductoring with Hendrix Spacer Cable will storm harden the system.

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in the O&R's Climate Change Vulnerability Study (filed September 2023, in NYPSC Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

Strong winds and ice accumulation can cause trees and tree limbs to fall, which can lead to contact with electric equipment, lines, and structures, potentially resulting in widespread outages and the cable system investments proposed decrease the Company's risk of those such outages occurring. Emergency response times may also be delayed if access to assets is hindered by downed trees from heavy precipitation, wind, and other extreme events.

Severe rain events can cause soft soil conditions which can increase the likelihood of trees falling down. Projections show that the number of days per year with more than 2 inches of rain could increase by 45% by 2050 and 77% by 2080 at Dobbs Ferry. The O&R service territory is also likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future and the potential exists for increased radial icing intensity. Furthermore, North Atlantic hurricanes are projected to become more intense (~5% increase) and have higher rainfall amounts (~10%-15% increase) relative to historical hurricanes. Projections indicate an increase in freezing rain frequency and ice thickness in New York State with greater ice accumulation on vertical surfaces due to enhanced surface wind speeds during cold seasons Thus, it is essential to implement these storm hardening practices to improve the resiliency of the O&R system.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project does not directly impact greenhouse gas emissions.

This project is in alignment with our goals to increase reliability through storm hardening, meet design standards, and upgrade aging infrastructure. In addition, the project addresses Corporate risk for Major Storms by providing storm hardening benefits.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

The Company did not consider underground construction due to the area being primarily overhead distribution with numerous customer connections. Undergrounding would result in significant additional costs for both the Company and its customers. O&R also did not consider armless or cross arm construction due to the fact that this area suffers from severe lightning strikes. Hendrix Spacer Cable construction is the preferred alternative.

Risk of No Action

Risk 1

If no action is taken, during storm conditions, the probability exists that this radial circuit would be lost for any tree related outage or a major vehicle accident on any single pole. This would leave affected customers without service until O&R completed the necessary repairs.

Non-Financial Benefits
The new reinforced spacer cable system overhead circuit will provide a back feed, thereby maintaining system reliability and providing additional storm hardening benefits to the surrounding area.

Summary of Financial Benefits and Costs (attach backup)
1. Cost-benefit analysis
See Enhanced Overhead Program for more information.
2. Major financial benefits
See Enhanced Overhead Program for more information.
3. Basis for estimate
Historical capital expenditures of similar overhead distribution projects.

Project Risks and Mitigation Plan

Risk 1	Mitigation plan
Length of permitting process could delay the overall project schedule.	Timely submissions and responses in regard to permit applications and questions/comments/concerns submitted by permitting entities.

Technical Evaluation / Analysis

N/A

Project Relationships (if applicable)

N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital						

2024-2028 Request:
Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)		$1,500.7			
Labor		$540.3			
M&S		$360.2			
Contract Svcs.		$150.1			

Other					
Overheads		**$450.1**			

Upper Nyack - Broadway (Castle Heights to Larchdale) Project

Electric Engineering

1. Project / Program Summary

Type: ☒ Project ☐ Program	**Category: ☒ Capital ☐ O&M ☐ Regulatory Asset**
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Upper Nyack - Broadway (Castle Heights to Larchdale) Project	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1):** 26351219
Status: ☒ Initiation/Planning ☐ In-Progress (Projects Only) ☐ On-going (Programs Only)	
Estimated Start Date: January 2027	**Estimated Date In Service:** December 2027
2024-2028 Funding Request ($000) **Capital:** $1,100.0 **O&M:**	

Work Description:

This project is to replace (radial) existing open wire (#2 Cu) and 477AAC cross arm construction primary with Hendrix Spacer construction (main line) on Broadway (between Castle Heights and Larchdale Ave) in Upper Nyack, NY. This area is served from Orange and Rockland Utilities, Inc.'s ("O&R" or the "Company") Snake Hill Substation (circuit 24-11-13) and serves 1,841 customers. This project will storm harden the area with Hendrix spacer construction to address service reliability and the distribution system associated with small and large storms on Broadway. During storm events (*e.g.*, wind, lightning), mature trees have damaged thee overhead distribution system, resulting in large scale outages. The area experiences multiple outages because of weather, tree and animal contact, and this project will reduce future outages.

This project requires replacement of 6,200 feet of existing 477AAC and #2Cu three-phase distribution with higher capacity mainline (600amp) spacer cable construction (477AAC). Using spacer cable design, the conductors will be able to withstand both tree and miscellaneous branch contacts, eliminate temporary faults, and provide enhanced lightning protection. This project will improve overall resiliency and will enhance reliability for local customers.

This project will improve system reliability associated with the overhead circuit during storm events. This will assist with isolation and help to back feed the circuit to assist in restoration.

Justification Summary:

This project will storm harden the local distribution system to refeed circuit 24-11-13 in the event of equipment failure, lightning, motor vehicle accident or vegetation contact. This project will meet all Company design standards associated with contingency conditions. This project will improve overall reliability and provide a reliable source to this area.

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in the O&R's Climate Change Vulnerability Study (filed September 2023, in NYPSC Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

Strong winds and ice accumulation can cause trees and tree limbs to fall, which can lead to contact with electric equipment, lines, and structures, potentially resulting in widespread outages and the cable system investments proposed decrease the Company's risk of those such outages occurring. Emergency response times may also be delayed if access to assets is hindered by downed trees from heavy precipitation, wind, and other extreme events.

Severe rain events can cause soft soil conditions which can increase the likelihood of trees falling down. Projections show that the number of days per year with more than 2 inches of rain could increase by 45% by 2050 and 77% by 2080 at Dobbs Ferry. The O&R service territory is also likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future and the potential exists for increased radial icing intensity. Furthermore, North Atlantic hurricanes are projected to become more intense (~5% increase) and have higher rainfall amounts (~10%-15% increase) relative to historical hurricanes. Projections indicate an increase in freezing rain frequency and ice thickness in New York State with greater ice accumulation on vertical surfaces due to enhanced surface wind speeds during cold seasons Thus, it is essential to implement these storm hardening practices to improve the resiliency of the O&R system.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project does not directly impact greenhouse gas emissions.

This project is in alignment with our goals to increase reliability through storm hardening, meet design standards, and upgrade aging infrastructure. In addition, the project addresses Corporate risk for Major Storms by providing storm hardening benefits.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
O&R chose Hendrix Spacer Cable system due to the size and amount of vegetation in the area. O&R did not consider underground construction as the area is predominately overhead construction and underground construction would be very difficult to implement.

Risk of No Action

Risk 1
If no action is taken, during storm conditions, the probability exists that this radial circuit would be lost for any tree related outage or a major vehicle accident on any single pole. In such event, customers would be out of service until O&R completed the necessary repairs.

Non-Financial Benefits

The new reinforced spacer cable system overhead circuit will provide a back feed, maintaining system reliability and providing additional storm hardening benefits to the surrounding area.

Summary of Financial Benefits and Costs (attach backup)
1. Cost-benefit analysis
See Enhanced Overhead Program for more information.
2. Major financial benefits
See Enhanced Overhead Program for more information.
3. Basis for estimate
Historical capital expenditures of similar overhead distribution projects.

Project Risks and Mitigation Plan

Risk 1	Mitigation plan
Length of permitting process could delay the overall project schedule.	Timely submissions and responses in regard to permit applications and questions/comments/concerns submitted by permitting entities.

Technical Evaluation / Analysis

N/A

Project Relationships (if applicable)

N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital						

2024-2028 Request:
Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)				$1,100.0	
Labor				$396.0	
M&S				$264.0	
Contract Svcs.				$110.0	
Other					
Overheads				$330.0	

Hazard Tree Removal Program Expansion

Transmission Distribution Maintenance

1. Project / Program Summary

Type: ☐ Project ☒ Program	**Category: ☐ Capital ☒ O&M**
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Hazard Tree Removal Program Expansion	
Project/Program Manager: Mark Beamish	**Project/Program Number (Level 1):**
Status: ☐ Initiation/Planning ☐ In-Progress (Projects Only) ☒ On-going (Programs Only)	
Estimated Start Date: Q1 2025	**Estimated Date In Service: Q4 2029**
2025-2029 Funding Request ($000) **Capital: $0** **O&M: $8,540**	

Work Description:

Orange and Rockland Utilities, Inc.'s (O&R or the Company) Hazard Tree Removal program removes hazardous trees, that are at risk of falling due to compromised health, in proximity to energized conductors, and the public and municipal reception to this initiative has been positive. Currently, eight full-time contractor crews complete this work. Due to the increased workload, the Company plans to expand this program and add eight more full-time contractor crews, for a total of sixteen crews, that will work on the Hazard Tree Removal program. In addition, the Company proposes to add one management employee for oversight of contractors associated with this program.

O&R instituted its hazard tree removal program in September 2018 following a vegetation assessment performed for the Company after Winter Storms Reilly and Quinn of early 2018. This assessment led the Company to implement additional and targeted storm hardening practices including a dedicated hazard tree removal program.

At that time, there was a noticeable impact from Emerald Ash Borer on the ash tree population, and this led to ash tree failures that were adversely impacting O&R infrastructure. As a result, O&R made a more concentrated effort to remove impacted ash trees, which became a core goal of the hazard tree removal program. In light of that, O&R included a concentrated effort to remove impacted ash trees as a core objective of the hazard tree removal program. Since the hazard tree removal kicked off, O&R removed 514 hazard trees in the final four months of 2018, 1,623 in 2019, 1,230 in 2020, 1,049 in 2021, 1,378 in 2022, and 1,313 YTD in 2023, with work continuing. From program inception to date, the Company has removed 7,107 hazard trees from the O&R system, at an ash to non-ash percentage of 70% ash to 30% non-ash trees.

O&R has seen positive results of the hazard tree removal program and O&R wants to enhance these positive results by increasing the hazard tree removal program by 500 additional hazard trees each year, starting in 2025, to a level to support removing 4,000 hazard trees per year by 2029. O&R will review the data from the reclosers and other distribution automation sensors to identify areas with frequent momentary outages to identify proactively areas where trees are encroaching on the distribution lines and direct crews to these areas to investigate and clear hazard trees before they cause sustained outages.

As part of the program funding, the Company plans to hire one management full time equivalent (FTE) (*i.e.*, Chief Construction Inspector) to manage the expanded Hazard Tree Removal program starting in 2025.

Justification Summary:

Trees falling on distribution lines and infrastructure are a primary cause of storm related outages. With the forecasted increase in storm frequency and intensity, a focus on proactive removal of trees with a high risk of falling or causing ground faults is more efficient than restoration of the distribution segment after a tree has fallen in a storm.

Projections indicate that the O&R service territory will face more intense storms in the future, emphasizing the importance of this program to reduce the number and duration of outages. Strong winds and ice accumulation can cause trees and tree limbs to fall, which can lead to contact with electric equipment, lines, and structures, potentially resulting in widespread outages, especially if poles are older or have existing damage. Emergency response times may also be delayed if access to assets is hindered by downed trees resulting from heavy precipitation, wind, and other extreme events.

As a result of climate change, the O&R service territory is likely to experience more frequent and intense wind and ice events, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation. In particular, the O&R service area is likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future. Climate projections from the CCVS indicate that warming atmospheric and ocean surface temperatures will likely invigorate hurricanes in the North Atlantic to become more intense (~5% increase, imply stronger hurricane winds) and have higher rainfall amounts (~10% to 15% increase) relative to historical hurricanes. Projections also show that maximum wind gusts could reach 110 mph in the future. Furthermore, despite the high uncertainty, the potential remains for increased freezing rain frequency and ice accumulation in the service area in the future. Severe rain events can cause soft soil conditions which can increase likelihood of trees falling into the Company's facilities. Projections show that the number of days per year with more than 2 inches of rain could increase by 45% by 2050 and 77% by 2080 at Dobbs Ferry.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

Impact on Disadvantaged Communities
The Company identified this program as a measure to mitigate climate-related risks across the O&R system based on potential system vulnerabilities, agnostic to customer demographics. This program will benefit all customers served by facilities included in-scope, including customers in Disadvantaged Communities.

Impact on Greenhouse Gas (GHG) Emissions
Removal of dead hazard trees has no direct impact on GHG emissions.

Impact on Clean Energy Commitment
The hazard tree program supports Initiative 2 under Pillar 1 of the Clean Energy Commitment, Build the Grid of the Future.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
O&R has identified strategic undergrounding projects as part of both this resiliency filing and its upcoming electric base rate case. O&R also anticipates strategic and tactical expansion of the undergrounding program over time. However, trees must be trimmed and removed to prevent encroachment on the distribution system until that feeder has been undergrounded.

Risk of No Action

Risk 1
Increased outages due to tree fall: As the frequency and intensity of severe storms increase, there is a higher likelihood of trees falling on distribution lines and causing sustained outages. Trees often cause damage to the infrastructure that takes longer to repair than some other outage causes. As a result, the system and customer outage durations are likely to increase.

Non-Financial Benefits

The hazard tree program will provide additional system reliability and storm hardening benefits to the surrounding area. This project also will help avoid customer service outages.

Summary of Financial Benefits and Costs (attach backup)
1. Cost-benefit analysis (if required)

The annual cost for additional hazard tree removal is listed in the table below. The benefits of this program are as described in the Justification Summary and Non-Financial Benefits sections above.

2. Basis for estimate

A current vegetation management industry issue is available labor, and the expectation is that labor prices may sharply increase due to the lack of workers, which would drive up tree removal costs. Currently, O&R is averaging about $1,000 per hazard tree in removal costs. To remove an additional 500 hazard trees, the cost would be approximately $500,000 over the current $2,000,000 budget. The proposed funding request is to fund the removal of an additional 500 hazard trees per year starting in 2025 from the current rate to 4,000 trees in 2029. Additionally, the increased hazard tree removal will require an additional FTE as supervisor with an annual O&M cost of $112,000 starting in 2025 (based on the median point of the salary band for this position).

Funding Request:

	2025	2026	2027	2028	2029
Number of additional hazard trees removed per year	500	1000	1500	2000	2500
Budget for additional hazard tree removal + 1 FTE (un-escalated)	$ 612,000	$ 1,112,000	$ 1,612,000	$ 2,112,000	$ 2,612,000
Budget for additional hazard	**$ 612,000**	**$ 1,136,000**	**$ 1,684,000**	**$ 2,254,000**	**$ 2,850,000**

tree removal + 1 FTE (2.2% escalation)					

Project Risks and Mitigation Plan

Evaluate and describe any risks that might extend the project timeline, prevent completion, or lead to cost overruns. Explain plan to minimize these risks.

Risk 1	Mitigation plan
Customer resistance to tree removal	Customers enjoy having trees in their neighborhoods. As a result, customers object to the removal of hazard trees in order to prevent interference with the distribution infrastructure. As a result, O&R will work to develop customer communications describing that the hazard trees are in poor health and why it is important to keep the trees away from the distribution infrastructure to help prevent outages, particularly during severe storms.

Risk 2	Mitigation plan
A current vegetation management industry issue is available labor, and the expectation is that labor prices may sharply increase due to the lack of workers, which would drive up tree removal costs.	Develop a procurement plan to solicit multiple contractors to conduct tree trimming operations with longer term contracts specifying the costs and fees to reduce cost variability.

Technical Evaluation / Analysis

Please refer to the climate change data and analysis in the justification summary above.

Project Relationships (if applicable)

Not applicable.

3. Funding Detail ($000)

2019-2024 Actual/Forecast Spend*

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Forecast 2023	Forecast 2024
O&M	**$673**	**$429**	**$541**	**$845**	**$2,000**	**$2,000**
Capital	**-**	**-**	**-**	**-**	**-**	**-**

This details the Company's historical and current projected hazard tree program.

2025-2029 Request*:

Total Request by Year:

	Request 2025	Request 2026	Request 2027	Request 2028	Request 2029
O&M	**$612**	**$1,136**	**$1,684**	**$2,254**	**$2,850**
Capital (Total)	$0	$0	$0	$0	$0
Labor	$0	$0	$0	$0	$0

M&S	$0	$0	$0	$0	$0
Contract Svcs.	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Overheads	$0	$0	$0	$0	$0

This details the budget to increase the current hazard tree program by 500 trees per year as part of the Company's Resilience Plan.

Long Range Funding Projections

	2030-2034	**2035-2039**	**2040-2044**
O&M	**$15,220**	**$16,970**	**$18,920**
Capital	**$0**	**$0**	**$0**
Basis for funding direction:	Annual inflation-related increases estimated (2.2%)	Annual inflation-related increases estimated (2.2%)	Annual inflation-related increases estimated (2.2%)

Explanation of Long Range Funding Projections:

The Company developed cost estimates for this program through 2029. For years 2030-2044, estimated cost accounts for same hazard tree removal level during 2029 and escalated by 2.2% each year for inflation.

Selective Undergrounding

Selective Undergrounding Resilience Program

Electric Engineering

1. Project / Program Summary

Type: ☐ Project ☒ Program	**Category: ☒ Capital ☐ O&M**
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Selective Undergrounding Resilience Program	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1):**
Status: ☐ Initiation/Planning ☐ In-Progress (Projects Only) ☒ On-going (Programs Only)	
Estimated Start Date: Q1 2025	**Estimated Date In Service: Q4 2029**
2025-2029 Funding Request ($000) **Capital: $143,880** **O&M: $0**	

Work Description:

Orange and Rockland Utilities, Inc.'s (O&R or the Company) Undergrounding Resilience Program (Program) is a continuation of existing initiatives aimed at enhancing the durability and reliability of the power distribution system. For transmissions system, the goal of the Underground Resilience Program is to install new underground transmission lines that will increase resiliency. For distribution system, the goals of the Underground Resilience Program are to reduce the amount of double overhead circuits, reduce off-road and difficult to access sites, as well as overhead lines over river and roadway crossing, as these locations will cause greater disruption and require more time to repair and restore service during storm restoration. This Program will also increase path diversity for the distribution system.

Undergrounding refers to moving overhead electrical lines and equipment below ground, thereby reducing their exposure to external hazards. This direct approach enhances system reliability, particularly during storm events, as it significantly minimizes outages caused by elements such as fallen branches and high winds. Undergrounding feeders will advance overall system resilience by mitigating exposure to external environmental hazards, reducing maintenance costs over the long term, and minimizing potential service interruptions caused by climate hazards. In addition to reducing response times and customer outages during extreme events, undergrounding also improves reliability during normal operating conditions by reducing risk from other sources, such as wildlife contact and car accidents.

O&R has identified Line 705 of its transmission system to be undergrounded. This project involves installation of a new 138 kV underground transmission line that will span approximately 5.5 miles entirely within the Town of Clarkstown, in Rockland County, NY for resiliency. This will also provide additional electric power capacity to the transmission system and customers in the southern Rockland County and northern Bergen County areas. The Line 705 project costs in 2025-26 are $53,441,000.

O&R has identified 19 distribution projects to strategically underground selected circuits in 2025 –27 to increase resilience of the existing distribution system, 9 of which are planned in disadvantaged

communities (DAC)and will benefit a total of 44 circuits. 14 of the 19 projects have met Company's standard procedure for white paper development (i.e., budgets in excess of $1,000,000 for one year or $2,000,000 within two consecutive years within the Company's next planned rate case period). These projects listed below.

Project Name	2025-27 Cost ($000)	Town	Circuit	Additional Circuits Benefit	DAC
24792135 - L1_U/G Storm Hardening - Blue Lake Ckt Exit	$3,800.1	Tuxedo	68-3-15 (new)	68-4-13, 42-1-13, 78-1-13	No
24792125 - L1_U/G Storm Hardening - Gilchrest Rd, Congers	$2,010.4	Congers	22-3-13	22-8-13	No
23190661 - West Haverstraw - Rt 202 to Rt 9w - 6400ft	$5,200.1	West Haverstraw	27-3-13	27-4-13, 27-8-13	Yes
23844985 - Little Tor Sub - Rt 45 (S Mtn to Rt 202) - 3,800 ft - Urd Dip	$2,400.7	New City	Little Tor Ckt (new)	45-5-13, 27-7-13	Yes
24525577 - Tuxedo Park - Crows Nest to S. Gate UG SH - 5100 ft	$2,000.2	Tuxedo Park	67-1-13	68-4-13	No
24545599 - Snake Hill - Urd Dip (Snake Hill to Nyack) 13,200 ft	$8,593.4	Upper Nyack	24-11-13	24-4-13	Yes
25373727 - L1_Bloomingburg SH UG 109-4-34 Winterton Rd	$3,082.8	Bloomingburg	109-4-34	12-1-13, 12-3-13	No
25373812 - L1_Harriman UG SH Ckt exits 71-1,2,& 8-13	$1,439.2	Harriman	71-1-13, 71-2-13, 71-8-13	NA	Yes
Cnty Route 105 - Larkin Road to Ridge Rd. - 10,500ft	$2,200.0	Palm Tree, Woodbury	Forest Ckt (new)	61-3-13, 61-7-13, 71-5-13	No
Sparkill - New UG Exit SH 50-5-13 - Rt 340 5,000ft	$3,000.0	Sparkill	50-5-13 (new)	50-3-13,30-5-13, 28-7-13	No
Mongaup - Plank Road & Mill Road - 2-1-13 8500ft	$5,000.0	Forestburgh	2-1-13	NA	No
Orangeburg - 54-2-13 - ALUF Plastics UG SH 2750ft	$1,500.0	Orangeburg	54-2-13	54-3-13,54-4-13	No
West Haverstraw - High Street/Main Street/Suffern Lane 4000ft	$2,400.0	Garnerville	27-6-13	27-1-13	Yes
Wurtsboro 109-4-34 Pine St. & Route 209 UG SH 5900ft	$3,900.0	Wurtsboro	109-4-13	10-2-13	No
Total:	**$46,526.9**				

Five of the 19 projects did not meet the Company's standard procedure for whitepaper development and are listed below.

Project Name	2025-27 Cost ($000)	Town	Circuit	Additional Circuits Benefit	DAC
22594287 - Pascack Rd UG Ckt 19-13-13 - (No White Paper Req.)	$1,199.7	Nanuet	19-13-13	19-9-13	Yes
22594290 - Old Nyack Turnpike UG Ckt 21-16-13 - - (No White Paper Req.)	$1,200.0	West Nyack	21-16-13	21-9-13	No
26218935 - L1_East Wallkill SH UG Circuit Exit 15-1-13 - (No White Paper Req.)	$799.9	Scotchtown	15-1-13	15-6-13	Yes
West Haverstraw - Bridge Street 27-8-13 1,000ft - (No White Paper Req.)	$400.0	West Haverstraw	27-8-13	27-5-13	Yes
Stony Point 23-3-13 - Central Highway UG SH 1100ft - (No White Paper Req.)	$600.0	Stony Point	23-3-13	23-6-13	Yes
Total:	**$ 4,199.6**				

Additionally, the Program has a target for undergrounding an approximately additional 13 miles over two years (2028-29) at a cost of $39,712,000 to continue enhancing resiliency and reliability. This program plan will target the worst-performing circuits and will consider equity (*i.e.*, DACs) in project development. Beyond 2029, this Program will underground an additional 8-9 miles per year. The

estimated program costs beyond 2029 are shown in the Long-Range Funding Projections table at the end of this white paper.

This resiliency program is proposed as a storm hardening measure in the Climate Change Resilience Plan filing, as required by Public Service Law (PSL) § 66(29); PSC Case 22-E-0222.

Justification Summary:

O&R's updated Climate Change Vulnerability Study (CCVS) indicates a projected increase in the frequency of intense storms in O&R's service territory, presenting risk to overhead power distribution systems. The O&R system includes 1,708 miles of overhead distribution conductor in New York, which is exposed to outages and interruptions due to extreme weather events. As a result of climate change, the O&R service territory is likely to experience more frequent and intense events such as high winds, icing, and high heat, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation.

As a result of climate change, the O&R service territory is likely to experience more frequent and intense wind and ice events, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation. In particular, the O&R service area is likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future. Climate projections from the CCVS indicate that warming atmospheric and ocean surface temperatures will likely invigorate hurricanes in the North Atlantic to become more intense (~5% increase, imply stronger hurricane winds) and have higher rainfall amounts (~10% to 15% increase) relative to historical hurricanes. Projections also show that maximum wind gusts could reach 110 mph in the future. Furthermore, despite the high uncertainty, the potential remains for increased freezing rain frequency and ice accumulation in the service area in the future.

Long-term savings associated with reduced restoration costs and shorter outage durations will occur as a result of undergrounding. By addressing the tangible effects of climate change on the power distribution infrastructure, this program not only reduces potential damage but also assures a more consistent and reliable power supply. The surrounding soil also provides thermal insulation to undergrounded equipment and lines, reducing the assets' exposure to extreme heat and cold events (including polar vortex events). This translates to fewer operational disruptions and dependable power distribution, especially critical during adverse weather conditions.

In determining the areas for the transition to underground systems, priority will be given to DACs. These areas often experience heightened impacts from prolonged outages. By focusing on these communities, O&R is addressing both service reliability and equity in infrastructure improvements.

Investing in undergrounding yields multiple long-term financial advantages. By transitioning to underground systems, O&R can anticipate significant savings from reduced restoration expenses and shorter outage durations. Additionally, the enhanced service reliability further solidifies the program's value, positioning it as a strategic investment for the future. By developing this program to continue the undergrounding, it would maintain contractors and have a holistic planning process for this resiliency tool. This program will also help increase the resiliency of the Company's distribution system by replacing double circuit overhead configuration with one overhead line and one underground line. During extreme weather events, the underground line would remain in service and would be available to back-feed customers that are served by the overhead line.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This program is in alignment with the Company's goals to increase resilience. In addition, this program addresses Corporate risk for Major Storms by providing storm hardening benefits. This program will also consider DACs when determining specific feeders to be undergrounded.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
Maintaining the current overhead feeder configuration without any additional interventions fails to address the escalating risks from increased storm intensity and does not align with O&R's resilience objectives.

Alternative 2 description and reason for rejection
Hendrix Spacer Cable is designed for high reliability and tree contact resistance. It is also compact to reduce tree trimming clearances. The conductors are covered with two layers of polymer design to allow intermittent tree contacts without causing an outage or nuisance tripping. The conductors are supported by a high strength messenger, which provides mechanical support, serves as a system neutral, and acts as a shield wire against lightning. However, due to its above-ground exposure, during emergency repairs the overhead double circuit configuration may require both circuits to be de-energized (*i.e.*, a tree could take down both lines). Hendrix Spacer Cable also requires more additional ongoing maintenance than undergrounded lines due to its overhead exposure.

Risk of No Action

Risk 1: The existing overhead system is constructed using double circuit design. During storm conditions, the probability exists that both circuits would be lost for any tree related outage or a motor vehicle accident on any single pole. This will leave those customers affected without service until O&R can complete the necessary repairs. Relocating one of the circuits underground increases reliability and resiliency to the surrounding area.

Risk 2: The risk of not having an underground program poses both a logistical and operational risk. With a program and funding targets, O&R will have certainty to secure funding in order to write contracts, buy supplies up front to reduce material lead times and hedge against future material costs, and better position against competition from more utilities increasing undergrounding investments as part of their resilience planning strategies. A program will provide a clear line of certainty in the market such that the contractors that O&R engages with will be able to better plan for future work, and plan workforce headcount more appropriately in advance.

Non-Financial Benefits

Undergrounding reduces risks from fallen lines during storms, enhancing public safety. As storms intensify, underground systems provide greater resilience against disruptions, ensuring a more reliable power supply. This translates to increased customer satisfaction. Prioritizing undergrounding in DACs promotes equity and addresses the heightened impacts these areas often face from prolonged outages.

Summary of Financial Benefits and Costs

1. Cost
Please refer to Funding Detail below for cost information.

2. Benefits
The benefits of this program are as described in the Non-Financial Benefits section above.

3. Basis for estimate
Please refer to the Work Description section for costs.

Project Risks and Mitigation Plan

Risk 1	Mitigation plan
Length of permitting process could delay the overall project schedule.	Timely submissions and responses in regard to permit applications and questions/comments/concerns submitted by permitting entities.

Risk 2	Mitigation plan
Obtain long lead time project materials.	Materials with long lead times, especially underground cables, are reviewed and orders are placed 1 to 2 years before the project is under construction in order to meet project deadlines.

Technical Evaluation / Analysis

Please refer to the climate change data and analysis in the justification summary above.

Project Relationships (if applicable)

Project relationships are not applicable.

3. Funding Detail ($000)

2019-2024 Actual/Forecast Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Forecast 2023	Forecast 2024
O&M	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Capital	**$786**	**$2,100**	**$3,800**	**$7,000**	**$9,715**	**$4,850**

2025-2029 Request:
Total Request by Year:

	Request 2025	Request 2026	Request 2027	Request 2028	Request 2029
O&M	**$0**	**$0**	**$0**	**$0**	**$0**
Capital (Total)	**$38,882**	**$47,864**	**$16,420**	**$18,512**	**$22,200**
Labor	$2,722	$3,351	$1,149	$1,296	$1,554
M&S	$14,497	$21,539	$7,389	$8,330	$9,990
Contract Svcs.	$13,609	$16,752	$5,747	$6,479	$7,770
Other	$0	$0	$0	$0	$0
Overheads	$5,055	$6,222	$2,135	$2,407	$2,886

Long Range Funding Projections

	2030-2034	2035-2039	2040-2044
O&M	$0	$0	$0
Capital	**$117,480**	**$130,980**	**$146,040**
Basis for funding direction:	Annual inflation-related increases estimated (2.2%)	Annual inflation-related increases estimated (2.2%)	Annual inflation-related increases estimated (2.2%)

Explanation of Long Range Funding Projections:

The Company developed cost estimates for this program through 2029. For years 2030-2044, estimated cost represents similar undergrounding level as 2029 going forward was escalated by 2.2% for inflation.

UG Storm Hardening – Rt 202 to Rt 9W, West Haverstraw, NY - 6000ft Project

Electric Engineering

1. Project / Program Summary

Type: ☒ **Project** ☐ **Program**	**Category:** ☒ **Capital** ☐ **O&M** ☐ **Regulatory Asset**
Work Plan Category: ☐ **Regulatory Mandated** ☒ **Operationally Required** ☐ **Strategic**	
Project/Program Title: UG Storm Hardening – Rt 202 to Rt 9W, West Haverstraw, NY - 6000ft Project	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1):** 23190661
Status: ☒ **Initiation/Planning** ☐ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: January 2023	**Estimated Date In Service:** December 2026
2024-2028 Funding Request ($000) **Capital:** $5,300.1 **O&M:**	

Work Description:

This is a Storm Hardening project to eliminate a double circuit distribution system along Rt. 202 to Rt. 9W in West Haverstraw, NY. This project will address poor service reliability on the distribution system associated with both small and large-scale storms, motor vehicle accidents and equipment failure. This project will replace an approximately 6,000 feet of overhead distribution with underground main-line distribution system between the station breaker and rise on Route 9W (near pole# 59867/43623). The underground cable system will consist of three-phase 750cu, CNJ 15kv cable, constructed with (4) six-inch scheduled 40 steel reinforced conduit system concrete encased, with a spare duct system for a potential future circuit. This project will improve public safety and will address poor reliability issues associated with the overhead circuits during storm events. The underground system will provide an alternate path in the event of a contingency issue. The project design will reduce the exposure on a double circuit pole line configuration and provide an alternate path to reroute a portion of the circuit that is most prone to damage.

Justification Summary:

The scope of this project will be to storm harden the local distribution system and eliminate a double circuit configuration along the distribution path on Route 202 in West Haverstraw, NY. Orange and Rockland Utilities, Inc. ("O&R" or the "Company") serves the Village of Haverstraw with three 13.2kV distribution circuits; two of those circuits (circuits 27-4-13 & 27-8-13) have an auto-loop design that transfers the load automatically from one circuit to another in the event of an outage. This auto-loop is located between Westside Ave to Broadway to Samsondale Ave. The third circuit (27-3-13) feeds the most southern part of Village of Haverstraw with limited distribution ties. As a result, circuit 27-3-13 fails the Company's contingency design criteria during peak summer periods. The purpose of this project will be to underground circuit 27-3-13 between the West Haverstraw station breaker and rise on Route 9W. Circuit 27-3-13 serves 2,695 customers, circuit 27-4-13 serves 2,475 customers, and circuit 27-8-13 serves 1,647 customers. In total, 6,817 commercial, residential, and industrial customers will benefit with this project.

Currently two of the distribution feeders are constructed as a double circuit (27-4-13 & 27-3-13) spacer construction pole line (approximately 6,000 feet in length) that starts at the West Haverstraw substation and continues south on Westside Ave (a.k.a. Rt. 202) to the intersection of Rt. 9W and Rt. 202 in Haverstraw. When an event occurs on this portion of the double circuit feeder either as a result of equipment failure, motor vehicle accident, lightning strike, both circuits (27-4-13 and 27-3-13) are in jeopardy of being off-loaded in order to expedite the repairs. Depending on time of year and loading of the two circuits, O&R's normal standard switching (cascading of load) will commence to isolate the fault and restore the majority of the customers within the Company's design criteria. However, during peak summer loading periods, the alternate circuit (27-8-13) cannot support the entire load of two additional circuits (27-4-13 & 27-3-13) due to cascading of load. As a result, circuit (27-3-13) with 2,700 customers may be without power until repairs are completed. This can be significant (6-8hrs) if a pole replacement is required. With the one circuit constructed to an underground design, the need to de-energize both circuits will not be required.

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in the O&R's Climate Change Vulnerability Study ("CCVS") (filed September 2023, in NYPSC Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially)

As a result of climate change, the O&R service territory is likely to experience more frequent and intense wind and ice events, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation. In particular, the O&R service territory is likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future. Climate projections from the CCVS indicate that warming atmospheric and ocean surface temperatures will likely cause hurricanes in the North Atlantic to become more intense (~5% increase, imply stronger hurricane winds) and have higher rainfall amounts (~10% to 15% increase) relative to historical hurricanes. Projections also show that maximum wind gusts could reach 110 mph in the future. Furthermore, despite the high uncertainty, the potential remains for increased freezing rain frequency and ice accumulation in the O&R service territory in the future.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project is in alignment with the Company's goals to increase reliability through storm hardening, meet design standard, and upgrade aging infrastructure. In addition, this project addresses risk for Major Storms by providing storm hardening benefits.

This project serves a disadvantaged community.

This project does not directly impact greenhouse gas emissions.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
The Company completed a detailed review to identify alternative routes. However, no options are available, and the underground distribution dip is the only solution. This underground storm hardening project will benefit 6,817 customers and improve public safety.

Alternative 2 description and reason for rejection
O&R did not consider Hendrix construction as O&R is trying to eliminate double circuit overhead construction. During emergency repairs the overhead double circuit configuration may require both circuits to be de-energized, as had occurred in the past.

Alternative 3 description and reason for rejection
This is a Storm Hardening reliability project construction design, and as such a non-wires alternative ("NWA") solution would not be suitable to address it.

Risk of No Action

Risk 1
The existing overhead system is constructed using double circuit design. During storm conditions, the probability exists that both circuits would be lost for any tree related outage or a motor vehicle accident on any single pole. Relocating one of the circuits underground increases reliability and storm hardens the surrounding area.

Non-Financial Benefits

The new underground mainline is required in this area to maintain system reliability and provide additional storm hardening benefits to the surrounding area.

Summary of Financial Benefits and Costs

1. Cost-benefit analysis
See Selective Undergrounding Resilience Program for more information.
2. Major financial benefits
See Selective Undergrounding Resilience Program for more information.
3. Basis for estimate

Historical Company capital expenditures of similar underground distribution projects. This project will provide benefits for 6,817 customers and the cost per customer to complete this project is only $781.00 per customer.
Project Risks and Mitigation Plan Risk 1 - Obtain project permits Mitigation plan – Review permitting with the proper public officials early in the process and review town/county/state requirements. Risk 2 - Obtain long lead time project materials Mitigation plan – Materials with long lead times, especially underground cables, are reviewed and orders are placed 1 to 2 years before the project is under construction in order to meet project deadlines.
Technical Evaluation / Analysis See Selective Undergrounding Resilience Program for more information.
Project Relationships (if applicable) N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital				**$49.0**		**$40.0**

2024-2028 Request ($000):

Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)	**$100.0**	**$2500.1**	**$2700.0**		
Labor	$39.7	$175.0	$190.0		
M&S		$1,125.0	$1,215		
Contract Svcs.	$50.0	$895.0	$965.0		
Other					
Overheads	$30.0	$305.1	$330.0		

UG Storm Hardening - Little Tor Sub - Rt 45 (S Mtn to Rt 202) - 3,800 ft Project

Electric Engineering

1. Project / Program Summary

Type: ☒ **Project** ☐ **Program**	**Category:** ☒ **Capital** ☐ **O&M** ☐ **Regulatory Asset**
Work Plan Category: ☐ **Regulatory Mandated** ☒ **Operationally Required** ☐ **Strategic**	
Project/Program Title: UG Storm Hardening - Little Tor Sub - Rt 45 (S Mtn to Rt 202) - 3,800 ft Project	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1):** 23844985
Status: ☒ **Initiation/Planning** ☐ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: January 2026	**Estimated Date In Service:** December 2027
2024-2028 Funding Request ($000) **Capital:** $2,400.7 **O&M:**	

Work Description:

In order to meet the distribution design criteria and reliably serve the area, Orange and Rockland Utilities, Inc. ("O&R" or the "Company") will construct a new substation (see Little Tor Substation project) in New City, N.Y. The new substation will be built with two – 50MVA, 138/13.2kV transformers with ten distribution circuits. Six of the circuits will be placed in service initially, with four provisioned for future use. This project is required to provide a circuit path for one of the six distribution circuit exits. The underground construction will start at the intersection of Rt. 45 and South Mountain Road and continue approximately 3,800 feet along Rt. 45 to the intersection of Rt. 45 and Old Rt. 202. Underground construction is needed for circuit path diversity and to avoid overhead double circuit construction (which is no longer a Company practice due to system resiliency goals). When complete, this circuit will serve both the Pomona and Mt Ivy / Garnerville area and provide relief to New Hempstead circuit (45-5-13) and the West Haverstraw circuit (27-7-13).

This project involves the construction of a new mainline (600amp) underground conduit system. The underground cable system will be approximately 3,800 feet in length, and will consist of three phase 750Cu, CNJ 15kv cable, constructed with (2) six-inch scheduled 40 PVC steel reinforced conduit system concrete encased. The underground conduit system will include multiple structures to house the cable terminations.

Justification Summary:

This project will provide relief to the distribution circuit 27-7-13 served from West Haverstraw substation and distribution circuit 45-5-13 served from New Hempstead substation, and provide storm harden benefits to the local distribution system. O&R completed a detailed review to identify alternative routes. However, O&R concluded that no options would benefit the circuits other than installation of an express underground feeder to serve the load. The installation of a double circuit overhead construction is not a current Company practice due to system resiliency goals. This project will benefit 1,959 customers on circuit 27-7-13 and 1,601 customers on circuit 45-5-13 and will meet all Company design standards associated with contingency conditions.

The New City area is located between the New Hempstead, Congers, and West Haverstraw Substations. As of 2023, these three substations and the temporary mobile transformer at the Little Tor site serve a combined total of approximately 39,341 customers and 177MVA of modified load at peak time. Approximately 48 percent of this load is supplied from the New Hempstead Substation and the Little Tor mobile transformer.

The construction of the Little Tor Substation is needed to address the following:

- For New Hempstead circuit 45-8-13 to meet design standard and avoid cascade switching or manual load shed in the event of a contingency during peak time;
- Provide relief to Congers circuits 22-1-13 and 22-4-13;
- Allow circuit 27-2-13 to pass the Company's distribution Design standard while retiring a long outage-prone line; and
- Allow for the mobile substation to be returned to the Company's emergency fleet to be used for its intended purpose.

This project is required to provide a circuit path for one of the six distribution circuit exits for the new substation. Underground construction is needed to provide circuit path diversity and avoid double circuit construction (which is no longer Company standard design). When complete, this circuit will serve both the Pomona and Mt Ivy / Garnerville area and provide relief to New Hempstead circuit 45-5-13 and the West Haverstraw circuit 27-7-13.

This project was in the Company's last base rate case (Case 21-E-0074) but is currently being delayed since it will not provide benefits until the Little Tor substation is constructed. The Little Tor substation project has been proceeding through an extensive New York State Environmental Quality Review Act and municipal permitting process. It is currently on hold due to an Article 78 proceeding filed by O&R against the Town of Clarkstown. The Town Board denied the project a Certificate of Appropriateness under a municipal historic road statute. Pending a successful appeal by the Company, construction of the new substation and an in-service date in 2026 can be obtained.

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in the O&R's Climate Change Vulnerability Study ("CCVS") (filed September 2023, in NYPSC Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

As a result of climate change, the O&R service territory is likely to experience more frequent and intense wind and ice events, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation. In particular, the O&R service territory is likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future. Climate projections from the CCVS indicate that warming atmospheric and ocean surface temperatures will likely cause hurricanes in the North Atlantic to become more intense (~5% increase, imply stronger hurricane winds) and have higher rainfall amounts (~10% to 15% increase) relative to historical hurricanes. Projections also show that maximum wind gusts could reach 110 mph in the future. Furthermore, despite the high uncertainty, the potential remains for increased freezing rain frequency and ice accumulation in the O&R service territory in the future.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project does not directly impact greenhouse gas emissions.

This project serves a disadvantaged community.

This project is in alignment with the Company's goals to increase reliability through storm hardening, meet design standard, and upgrade aging infrastructure along with increasing hosting capacity to facilitate achievement of the Climate Leadership and Community Protection Act's ("CLCPA") goals. In addition, the project addresses risk for Major Storms by providing storm hardening benefits.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
The Company completed a detailed review to identify alternative routes. However, no options would benefit the circuit other than installation of an express underground feeder to serve the load. This underground storm hardening project will benefit 3,560 customers and will improve public safety.

Alternative 2 description and reason for rejection
O&R did not consider Hendrix construction as the Company is trying to eliminate double circuit overhead construction. During emergency repairs the overhead double circuit configuration may require both circuits to be de-energized.

Alternative 3 description and reason for rejection
Non-wires alternative ("NWA"): The Company applied the NWA Suitability Criteria matrix and determined that the Little Tor Substation was not a suitable project for an NWA solution.

Risk of No Action

Risk 1
The existing infrastructure in the area is not capable of supporting the proposed growth. If growth in the area continues, the increased load will cause the distribution circuits to fail the Company's Distribution Design Standard.

Non-Financial Benefits

The new underground mainline extension is required in this area to maintain system reliability and to meet distribution planning criteria requirements for the distribution circuits that serve the surrounding area. Because O&R will install this project underground, additional storm hardening benefits will be realized.

Summary of Financial Benefits and Costs

1. Cost-benefit analysis
See Selective Undergrounding Resilience Program for more information.
2. Major financial benefits
See Selective Undergrounding Resilience Program for more information.
3. Basis for estimate
Historical Company capital expenditures of similar underground distribution projects. This project will provide benefits for 3,560 customers and the cost per customer to complete this project is $674.00 per customer.

Project Risks and Mitigation Plan
Evaluate and describe any risks that might extend the project timeline, prevent completion, or lead to cost overruns. Explain plan to minimize these risks.

Risk 1 - Obtain project permits.

Mitigation plan - Review permitting with the proper public officials early in the process and review town/county/state requirements.

Risk 2 - Obtain long lead time project materials.

Mitigation plan - Materials with long lead times, especially underground cables, are reviewed and orders are placed 1 to 2 years before the project is under construction in order to meet project deadlines.

Technical Evaluation / Analysis
See Selective Undergrounding Resilience Program for more information.

Project Relationships (if applicable)

N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital						

2024-2028 Request ($000):
Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)			**$200.7**	**$2,200.0**	
Labor			$40.0	$156.0	
M&S				$990.0	
Contract Svcs.			$100.0	$787.5	
Other					
Overheads			$60.7	$266.5	

UG Storm Hardening - Tuxedo Park – Crows Nest to S. Gate Project

Electric Engineering

1. Project / Program Summary

Type: ☒ Project ☐ Program	**Category: ☒ Capital ☐ O&M ☐ Regulatory Asset**
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	

Project/Program Title: UG Storm Hardening - Tuxedo Park – Crows Nest to S. Gate Project	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1):** 24545577
Status: ☒ **Initiation/Planning** ☐ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: September 2024	**Estimated Date In Service:** December 2026
2024-2028 Funding Request ($000) **Capital:** $2,002.5 **O&M:**	

Work Description:
This is a storm hardening project to construct an underground main line distribution circuit tie between the Sterling Forest Substation (Ckt: 67-1-13) and the Blue lake Substation (Ckt: 68-4-13) from Crow's Nest Road to South Gate Road in the Town of Tuxedo, NY. This project will address poor service reliability on the distribution system associated with both small- and large-scale storms and equipment failures. This project will replace 1,800 feet of overhead construction that is "off-road" down a very steep mountain and is very difficult to maintain and operate. The underground cable system will be approximately 5,100 feet in length and consist of three-phase 750cu, CNJ 15kv cable, constructed with (2) six-inch scheduled 40 steel reinforced conduit system concrete encased. Orange and Rockland Utilities, Inc. ("O&R" or the "Company") will install the underground system down an existing fire trail starting at the top of Crow's Nest Road at pole# 53244/43125 and will rise back up on South Gate Road at pole# 53083/42969.

Justification Summary:
The purpose of this project is to convert existing distribution voltage from 2.4kV to 13.2kV and provide a path to establish a 13.2kV distribution circuit tie between Sterling Forest circuit: 67-1-13 and Blue Lake circuit: 68-4-13. This project will benefit 1,139 customers on circuit 67-1-13 and 583 customers on circuit 68-4-13 and will meet all design standards associated with contingency conditions. This new 13.2kV circuit tie will provide a contingency / alternate service to back up Tuxedo Park, as Tuxedo Park will be a "radial feed" until completion of this underground project.

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in the O&R's Climate Change Vulnerability Study ("CCVS") (filed September 2023, in NYPSC Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

As a result of climate change, the O&R service territory is likely to experience more frequent and intense wind and ice events, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation. In particular, the O&R service territory is likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future. Climate projections from the CCVS indicate that warming atmospheric and ocean surface temperatures will likely cause hurricanes in the North Atlantic to become more intense (~5% increase, imply stronger hurricane winds) and have higher rainfall amounts (~10% to 15% increase) relative to historical hurricanes. Projections also show that maximum wind gusts could reach 110 mph in the future. Furthermore, despite the high uncertainty, the potential remains for increased freezing rain frequency and ice accumulation in the O&R service territory in the future.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act
This project does not directly impact greenhouse gas emissions.

This project does not serve a disadvantaged community.

This project is in alignment with the Company's goals to meet design standard, upgrade aging infrastructure, along with increasing hosting capacity to facilitate achievement of the Climate Leadership and Community Protection Act's ("CLCPA") goals. In addition, the project addresses risk for Major Storms by providing storm hardening benefits.

2. Supplemental Information

Alternatives
Alternative 1 description and reason for rejection
The Company completed a detailed review to identify alternative routes. O&R was not able to identify a viable alternative as the scope of the project will eliminate 1,800 ft of "off-road' construction built in 1940 and establish a new 13.2kV distribution circuit tie (circuits 67-1-13 / 68-4-13). This underground storm hardening project will benefit 1,722 customers and improve public safety.

Alternative 2 description and reason for rejection
O&R did not consider the installation of Hendrix or armless construction, as the scope of this project will be to eliminate off-road overhead construction. The replacement with new overhead construction will eliminate any of the current challenges that make the existing construction very difficult or near impossible to maintain and operate.

Alternative 3 description and reason for rejection
This is a Storm Hardening reliability project construction design, and as such a non-wires alternative ("NWA") solution would not be suitable.

Risk of No Action

Risk 1
The existing overhead construction is built "off-road" down a very steep mountain and is very difficult to maintain and operate during storm or blue-sky conditions. Any damage to the current construction could require an extended amount of time to repair and could result in extended customer outages. Installing the tie underground will increase reliability and storm hardens the surrounding area.

Non-Financial Benefits

The new underground mainline is required in this area to maintain system reliability, provide backup capability, and additional storm hardening benefits to the surrounding area.

Summary of Financial Benefits and Costs (attach backup)
1. Cost-benefit analysis (if required)
See Selective Undergrounding Resilience Program for more information.
2. Major financial benefits
See Selective Undergrounding Resilience Program for more information.
3. Basis for estimate

Historical Company capital expenditures for similar underground distribution projects. This project will provide benefits for 1,722 customers and the cost per customer to complete this project is $1,163.00 per customer.
Project Risks and Mitigation Plan Risk 1 - Obtain project permits. Mitigation plan - Review permitting with the proper public officials early in the process and review town/county/state requirements. Risk 2 - - Obtain long lead time project materials. Mitigation plan - Materials with long lead times, especially underground cables, are reviewed and orders are placed one to two years before the project is under construction in order to meet project deadlines.
Technical Evaluation / Analysis See Selective Undergrounding Resilience Program for more information.
Project Relationships (if applicable) N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital						

2024-2028 Request ($000):

Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)	**$2.3**	**$200.0**	**$1,800.2**		
Labor	$1.3	$40.0	$126.0		
M&S			$810.0		
Contract Svcs.		$100.0	$644.2		
Other					
Overheads	$1.0	$60.0	$220.0		

UG Storm Hardening - Gilchrest Rd, Congers, NY Project

Electric Engineering

1. Project / Program Summary

Type: ☒ **Project** ☐ **Program**	**Category:** ☒ **Capital** ☐ **O&M** ☐ **Regulatory Asset**
Work Plan Category: ☐ **Regulatory Mandated** ☒ **Operationally Required** ☐ **Strategic**	
Project/Program Title: UG Storm Hardening - Gilchrest Rd, Congers, NY Project	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1):** 24792125
Status: ☒ **Initiation/Planning** ☐ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: January 2026	**Estimated Date In Service:** December 2027
2024-2028 Funding Request ($000) **Capital:** $2,019.3 **O&M:**	

Work Description:

This is a Storm Hardening project to eliminate a double circuit distribution system along Gilchrest Road in Congers, NY to address poor service reliability on the distribution system associated with both small- and large-scale storms and equipment failure. This project involves Orange and Rockland Utilities, Inc.'s ("O&R" or the "Company") replacement of approximately 3,400 feet of overhead distribution with underground main-line distribution system between station breaker and rise on Rt. 303 in Congers, NY (near pole# 60880/41429). The underground cable system will consist of three-phase 750cu, CNJ 15kv cable, constructed with (4) four six-inch scheduled 40 steel reinforced conduit system concrete encased, with a spare duct system for a potential future circuit. This project will improve poor reliability issues associated with the overhead circuits during storm events. The underground system will provide an alternate path in the event of a contingency issue. The project design will reduce the exposure on a double circuit pole line configuration and provide an alternate path to reroute a portion of the circuit that is most prone to damage.

Justification Summary:

The scope of this project will be to storm harden the local distribution system and eliminate a double circuit configuration along the distribution path on Gilchrest Road in Congers, NY. Currently the Congers circuits (22-3-13, 22-8-13) are fed from a double circuit pole line along Gilchrest Road. The purpose of this project will be to underground circuit 22-3-13 between the Congers station breaker and rise on Route 303 (pole# 60780/41429). Circuit 22-3-13 serves 506 customers, and circuit 22-8-13 serves 599 customers; in total 1,105 commercial, residential, and industrial customers will benefit from this project. During past storms, this portion of Gilchrest Road has been damaged due to tree contacts resulting in large scale outages to those customers. Eliminating the double circuit will improve the reliability for O&R's customers in Congers, NY. The spare conduit system will be for a future circuit when the Congers switchgear has been replaced and the station will be expanded to include a total of 10 distribution circuits.

This project was approved in the Company's last rate case (Case 21-E-0074) but was delayed for a higher priority project that had an increased project scope and provided more customer benefits by utilizing the same civil system routing that was already under construction. This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in the O&R's Climate Change Vulnerability Study ("CCVS") (filed September 2023, in Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

As a result of climate change, the O&R service territory is likely to experience more frequent and intense wind and ice events, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation. In particular, the O&R service territory is likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future. Climate projections from the CCVS indicate that warming atmospheric and ocean surface temperatures will likely cause hurricanes in the North Atlantic to become more intense (~5% increase, imply stronger hurricane winds) and have higher rainfall amounts (~10% to 15% increase) relative to historical hurricanes. Projections also show that maximum wind gusts could reach 110 mph in the future. Furthermore, despite the high uncertainty, the potential remains for increased freezing rain frequency and ice accumulation in the O&R service territory in the future.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project does not directly impact greenhouse gas emissions.

This project is not located in a disadvantaged community.

This project is in alignment with the Company's goals to increase reliability through storm hardening, meet design standard, and upgrade aging infrastructure. In addition, this project addresses risk for major storms by providing storm hardening benefits.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
The Company completed a detailed review to identify alternative routes. However, no options are available, and the underground distribution dip is the only solution. This underground storm hardening project will benefit 1,105 customers and will improve public safety.

Alternative 2 description and reason for rejection
O&R did not consider Hendrix spacer cable construction as O&R is trying to eliminate double circuit overhead construction. During emergency repairs the overhead double circuit configuration may require both circuits to be de-energized, as had occurred in the past.

Alternative 3 description and reason for rejection
This is a Storm Hardening reliability project construction design, and as such a non-wires alternative ("NWA") solution would not be suitable.

Risk of No Action

Risk 1
The existing overhead system is constructed using double circuit design. During storm conditions, the probability exists that both circuits would be lost for any tree related outage or a motor vehicle accident on any single pole. Relocating one of the circuits underground increases reliability and storm hardens the surrounding area.

Non-Financial Benefits The new underground mainline is required in this area to maintain system reliability and provide additional storm hardening benefits to the surrounding area.
Summary of Financial Benefits and Costs (attach backup) 1. Cost-benefit analysis (if required) See Selective Undergrounding Resilience Program for more information. 2. Major financial benefits See Selective Undergrounding Resilience Program for more information. 3. Basis for estimate Historical Company capital expenditures for similar underground distribution projects. This project will provide benefits for 1,105 customers and the cost per customer to complete this project is $1,828.00 per customer.
Project Risks and Mitigation Plan Risk 1 - Obtain project permits. Mitigation plan - Review permitting with the proper public officials early in the process and review town/county/state requirements. Risk 2 - Obtain long lead time project materials. Mitigation plan - Materials with long lead times, especially underground cables, are reviewed and orders are placed 1 to 2 years before the project is under construction in order to meet project deadlines.
Technical Evaluation / Analysis See Selective Undergrounding Resilience Program for more information.
Project Relationships (if applicable) N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital						

2024-2028 Request ($000):
Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					

Capital (Total)	**$9.0**	**$10.3**	**$100.0**	**$1,900.0**	
Labor			$20.0	$135.0	
M&S				$855.0	
Contract Svcs.			$50.0	$680.0	
Other					
Overheads	**$9.0**	**$10.3**	$30.0	$230.0	

UG Storm Hardening – Long Meadow Road - Blue Lake Ckt Exit Project

Electric Engineering

1. Project / Program Summary

Type: ☒ Project ☐ Program	**Category: ☒ Capital ☐ O&M ☐ Regulatory Asset**
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: UG Storm Hardening – Long Meadow Road - Blue Lake Ckt Exit Project	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1):** 24792135
Status: ☒ Initiation/Planning ☐ In-Progress (Projects Only) ☐ On-going (Programs Only)	
Estimated Start Date: January 2024	**Estimated Date In Service:** December 2026
2024-2028 Funding Request ($000) **Capital:** $3,909.9 **O&M:**	

Work Description:

This is a Storm Hardening project to install a new station exit (circuit 68-3-2B) from the Blue Lake Substation along Long Meadow Road to Sterling Mine Road in the Town of Tuxedo, NY. This project will address additional new load requirements and poor service reliability on the distribution system associated with both small- and large-scale storms. This project will begin at Blue Lake station breaker (68-3-2B) and rise on pole# 52626/41870 located on Sterling Mine Road. Orange and Rockland Utilities, Inc. ("O&R" or the "Company") received an application for a new large (5MW) project to be constructed on Sterling Mine Road near the border of Orange and Rockland Counties. This additional load will require that O&R construct an additional distribution circuit to the surrounding area. The underground cable system will be approximately 5,900 feet in length and will consist of three-phase 750cu, CNJ 15kv cable, constructed with (2) two six-inch scheduled 40 steel reinforced conduit system concrete encased. This project will improve system reliability associated with the overhead circuit during storm events. Undergrounding the feeder will help avoid the installation of a double circuit overhead construction which is not a current Company practice due to system resiliency goals.

Justification Summary:

This project will storm harden the local distribution system, provide additional load capacity, and provide an alternate distribution path to back feed both Sloatsburg Substation and Blue Lake circuit (68-4-13) in the event of equipment failure, motor vehicle accident, or vegetation contact. The installation a double circuit overhead construction is not a current Company practice due to system resiliency goals. This project will benefit 1,771 customers for the 68-4-13, 42-1-13, and 78-1-13 circuits and will meet all Company design standards associated with contingency conditions.

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in the O&R's Climate Change Vulnerability Study (filed September 2023, in NYPSC Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

As a result of climate change, the O&R service territory is likely to experience more frequent and intense wind and ice events, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation. In particular, the O&R service area is likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future. Climate projections from the CCVS indicate that warming atmospheric and ocean surface temperatures will likely invigorate hurricanes in the North Atlantic to become more intense (~5% increase, imply stronger hurricane winds) and have higher rainfall amounts (~10% to 15% increase) relative to historical hurricanes. Projections also show that maximum wind gusts could reach 110 mph in the future. Furthermore, despite the high uncertainty, the potential remains for increased freezing rain frequency and ice accumulation in the service area in the future.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project does not directly impact greenhouse gas emissions.

This project is not located in a disadvantaged community.

This project is in alignment with the Company's goals to meet design standard, upgrade aging infrastructure, along with increasing hosting capacity to facilitate achievement of the Climate Leadership and Community Protection Act's ("CLCPA") goals. In addition, the project addresses Corporate risk for Major Storms by providing storm hardening benefits.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

The Company completed a detailed review to identify alternative routes. However, no options are available, and the underground distribution dip is the only solution. This underground storm hardening project will benefit 1,771 customers and improve public safety.

Alternative 2 description and reason for rejection

O&R did not consider Hendrix construction as the Company is trying to eliminate double circuit overhead construction. During emergency repairs the overhead double circuit configuration may require both circuits to be de-energized.

Alternative 3 description and reason for rejection

This is a Storm Hardening reliability project construction design, and as such a non-wires alternative ("NWA") solution would not be suitable.

Risk of No Action

Risk 1
If this project is not completed, O&R will have difficulty in meeting the new demand requirements for a large block of customer loads scheduled to be in service shortly. This project will improve system reliability associated with the overhead circuit during storm events. The underground system will provide an alternate path and will reduce exposure to the surrounding area that is most prone to storm damage.

Risk 2
Risk 3

Non-Financial Benefits

The new underground mainline is required in this area to maintain system reliability and provide additional storm hardening benefits to the surrounding area. This additional circuit exit will also increase hosting capacity to facilitate achievement of the CLCPA's goals.

Summary of Financial Benefits and Costs (attach backup)
1. Cost-benefit analysis (if required)
See Selective Undergrounding Resilience Program for more information.
2. Major financial benefits
See Selective Undergrounding Resilience Program for more information.
3. Basis for estimate

Historical Company capital expenditures of similar underground distribution projects. This project will provide benefits for 1,771 customers and the cost per customer to complete this project is $2,208.00 per customer.

Project Risks and Mitigation Plan

Risk 1 - Obtain project permits.

Mitigation plan - Review permitting with the proper public officials early in the process and review town/county/state requirements.

Risk 2 - Obtain long lead time project materials.

Mitigation plan - Materials with long lead times, especially underground cables, are reviewed and orders are placed 1 to 2 years before the project is under construction in order to meet project deadlines.

Technical Evaluation / Analysis
See Selective Undergrounding Resilience Program for more information.

Project Relationships (if applicable)
N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital						

2024-2028 Request ($000):
Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)	**$109.8**	**$2,400.1**	**$1,400.0**		
Labor	$22.0	$170.5	$100.0		
M&S		$1,080.0	$630.0		
Contract Svcs.	$55.0	$860.0	$500.0		
Other					
Overheads	$32.8	$289.6	$170.0		

UG Climate Resilience - Snake Hill (Snake Hill to Nyack) Project

Electric Engineering

1. Project / Program Summary

Type: ☒ **Project** ☐ **Program**	**Category:** ☒ **Capital** ☐ **O&M** ☐ **Regulatory Asset**
Work Plan Category: ☐ **Regulatory Mandated** ☒ **Operationally Required** ☐ **Strategic**	
Project/Program Title: UG Climate Resilience - Snake Hill (Snake Hill to Nyack) Project	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1):** 24545599
Status: ☒ **Initiation/Planning** ☐ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: January 2025	**Estimated Date In Service:** December 2027
2024-2028 Funding Request ($000) **Capital:** $8,593.4 **O&M:**	
Work Description: This is an underground climate resilience project to install a new distribution circuit out of Orange and Rockland Utilities, Inc.'s ("O&R" or the "Company") Snake Hill Substation to serve the load in Upper Nyack, NY and eliminate a double circuit distribution system along Crusher Road/Storms Road in Valley Cottage, NY. This project will address poor service reliability on the distribution system associated with both small- and large-scale storms and equipment failures. The new circuit 24-6-13 underground exit will be fed from Bank 224, will proceed up Crusher Road, Storms Road, Christian Herald and riser on Rt 9w at pole# 61182/40405 in Upper Nyack NY. The underground feeder will be approximately 13,200 feet in length. This project will also replace approximately 9,000 feet of overhead distribution with underground main-line distribution system between station	

breaker for circuit 24-11-13 and rise on Christian Herald Road in Valley Cottage, NY (near pole# 60931/40551). The underground cable systems will consist of three-phase 750cu, CNJ 15kv cable, constructed with (4) six inch scheduled 40 steel reinforced conduit system concrete encased.

This project will improve system reliability associated with the overhead circuit during storm events. This project's design will also reduce overhead exposure and provide an alternate path to reroute a portion of the circuit (24-11-13) underground that is prone to damage, thereby increasing system resilience.

Justification Summary:

The scope of this project will be to storm harden the local distribution system, add addition circuit capacity with new circuit 24-6-13, and provide an alternate distribution path to refeed circuit 24-11-13 in the event of equipment failure, lightning, motor vehicle accident or vegetation contact. This project will benefit circuit 24-11-13 which serves 1,876 customers and circuit 24-4-13 which serves 1,360 customers. This project will allow the circuit to meet all Company design standards associated with contingency conditions. Circuit 24-11-13, as per the 2022 Eastern Worst performing circuits ranked 31, out of 103 circuits feeders. Existing circuit 21-11-13 is operating at 7 MVA and is expected to increase to 9MW within a few years, as a large condominium project is currently under construction in Upper Nyack along the Hudson River.

In total 3,236 customers will benefit from the underground storm hardening projects and improve public safety. In addition, Nyack Hospital and multiple schools in the area will benefit as the project will improve resilience/reliability issues in the event that circuit 21-12-13 is out especially during storm events.

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in the O&R's Climate Change Vulnerability Study ("CCVS") (filed September 2023, in NYPSC Case 22-E-0222), the Company anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

As a result of climate change, the O&R service territory is likely to experience more frequent and intense wind and ice events, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation. In particular, the O&R service territory is likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future. Climate projections from the CCVS indicate that warming atmospheric and ocean surface temperatures will likely cause hurricanes in the North Atlantic to become more intense (~5% increase, imply stronger hurricane winds) and have higher rainfall amounts (~10% to 15% increase) relative to historical hurricanes. Projections also show that maximum wind gusts could reach 110 mph in the future. Furthermore, despite the high uncertainty, the potential remains for increased freezing rain frequency and ice accumulation in the O&R service territory in the future.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project does not have any direct impact on greenhouse gas emissions.

This project is in alignment with the Company's goals to meet design standard, upgrade aging infrastructure, increase reliability/resilience, along with increasing hosting capacity to facilitate achievement of the Climate Leadership and Community Protection Act's ("CLCPA") goals. In addition, this project addresses Corporate risk for Major Storms by providing storm hardening benefits.

This project serves a disadvantaged community.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
O&R completed a detailed review to identify alternative routes. However, no options are available and this project will benefit local customers. A new distribution feeder out of Snake Hill Substation was the only solution.

Alternative 2 description and reason for rejection
Hendrix construction was not considered as the Company is trying to eliminate double circuit overhead construction. A portion of the route would require the installation of a triple overhead circuit.

Alternative 3 description and reason for rejection
This is a Storm Hardening reliability project construction design, and as such a non-wires alternative ("NWA") solution would not be suitable.

Risk of No Action

Risk 1
The existing overhead system is constructed using double circuit design. During storm conditions, the probability exists that both circuits would be lost for any tree related outage or a motor vehicle accident involving any single pole. Relocating one of the circuits underground increases reliability and storm hardens the surrounding area. The installation of an additional circuit will provide load relief to the area as well.

Non-Financial Benefits

The new underground mainline is required in this area to maintain system reliability and provide additional storm hardening benefits to the surrounding area.

Summary of Financial Benefits and Costs (attach backup)
1. Cost-benefit analysis (if required)
See Selective Undergrounding Resilience Program for more information.
2. Major financial benefits
See Selective Undergrounding Resilience Program for more information.
3. Basis for estimate

Historical Company capital expenditures for similar underground distribution projects. This project will provide benefits for 3,236 customers and the cost per customer to complete this project is $2,656.00 per customer.
Project Risks and Mitigation Plan Risk 1 - Obtain project permits. Mitigation plan – Review permitting with the proper public officials early in the process and review town/county/state requirements. Risk 2 - Obtain long lead time project materials. Mitigation plan - Materials with long lead times, especially underground cables, are reviewed and orders are placed 1 to 2 years before the project is under construction in order to meet project deadlines.
Technical Evaluation / Analysis See Selective Undergrounding Resilience Program for more information.
Project Relationships (if applicable) N/A

3. Funding Detail ($000)

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital						

2024-2028 Request ($000):
Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)		**$205.0**	**$4,109.0**	**$4,279.4**	
Labor		$40.0	$292.0	$300.0	
M&S			$1,850.0	$1,925.4	
Contract Svcs.		$105.0	$1,471.0	$1,500.0	
Other					
Overheads		$60.0	$496.0	$554.0	

UG Climate Resilience - Bloomingburg 109-4-34 Winterton Rd Project

Electric Engineering

1. Project / Program Summary

Type: ☒ Project ☐ Program	**Category: ☐ Capital ☐ O&M ☐ Regulatory Asset**

Work Plan Category: ☐ **Regulatory Mandated** ☒ **Operationally Required** ☐ **Strategic**	
Project/Program Title: UG Climate Resilience - Bloomingburg 109-4-34 Winterton Rd Project	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1):** 25373727
Status: ☒ **Initiation/Planning** ☐ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: January 2025	**Estimated Date In Service:** June 2027
2024-2028 Funding Request ($000) **Capital:** $3,082.8 **O&M:**	

Work Description:

This is an underground climate resilience project to eliminate a double circuit overhead construction between Orange and Rockland Utilities, Inc.'s ("O&R" or the "Company") Bloomingburg Substation located on Winterton Road and Main Street in the Village of Bloomingburg, NY. The existing overhead construction is a 34.5kV top circuit (109-4-34) with a 13.2kV bottom circuit installed on the existing pole line. The project scope will be to eliminate the top circuit (109-4-34) between the substation and where it will rise on a new inter built pole # 47072/56627 located on Main Street, approximately 5,000 feet in length. The project will also include the installation of a conduit system to serve three (3) future 13.2kV distribution circuits for when the existing substation is upgraded. The spare conduits will start at the station and stop near the intersection of Main Street (Grid# 47089/56618) and Rt 17M in Bloomingburg. The 5,000-foot underground cable system will consist of three-phase 750cu, CNJ 35kv cable, constructed with eight (8) six inch scheduled 40 steel reinforced conduit system concrete encased, the spare duct system will be for potential future circuits.

This project will improve system reliability associated with the overhead circuit during storm events, equipment failures, or motor vehicle accidents. The underground system will provide an alternate path in the event of a contingency issue. The project design will reduce the exposure on a double circuit pole line configuration and provide an alternate path to reroute a portion of the circuit that is most prone to damage increasing system resilience.

Justification Summary:

The scope of this project will be to storm harden the local distribution system and provide an alternated distribution path to back feed the following substations: Bullville, Wurtsboro, and Cuddebackville. This project will benefit 3,283 customers initially (Circuits 12-1-13 & 12-3-13) and will meet all current Company design standards associated with contingency conditions.

Per the 2022 Service Reliability Annual report, Circuit 109-4-13 (top circuit) on South Street experienced 58 interruptions which affected 8,617 customers or 13,758 customer hours of interruption. Circuit 109-4-34 is currently ranked first as the worst performing circuit in the Western Division. Circuit 12-1-13 (bottom circuit) experienced 47 interruptions which affected 3,864 customers, that resulted in 12,846 customer hours of interruption and is ranked fourth worst performing circuit in the Western Division.

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in the O&R's Climate Change Vulnerability Study ("CCVS") (filed September 2023, in NYPSC Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;

- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

As a result of climate change, the O&R service territory is likely to experience more frequent and intense wind and ice events, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation. In particular, the O&R service territory is likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future. Climate projections from the CCVS indicate that warming atmospheric and ocean surface temperatures will likely cause hurricanes in the North Atlantic to become more intense (~5% increase, imply stronger hurricane winds) and have higher rainfall amounts (~10% to 15% increase) relative to historical hurricanes. Projections also show that maximum wind gusts could reach 110 mph in the future. Furthermore, despite the high uncertainty, the potential remains for increased freezing rain frequency and ice accumulation in the O&R service territory in the future.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act
This project does not directly impact greenhouse gas emissions.

This project does not directly impact any disadvantaged communities.

This project is in alignment with the Company's goals to meet design standard, upgrade aging infrastructure, increase reliability/resilience, along with increasing hosting capacity to facilitate the achievement of the Climate Leadership and Community Protection Act's ("CLCPA") goals. In addition, the project addresses Corporate risk for Major Storms by providing storm hardening benefits.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
The Company completed a detailed review to identify alternative routes. However, no options are available, and the underground distribution dip is the only solution. This underground storm hardening project will benefit 3,283 customers and will improve public safety.

Alternative 2 description and reason for rejection
O&R did not consider Hendrix construction as the Company is trying to eliminate double circuit overhead construction. During emergency repairs the overhead double circuit configuration may require both circuits to be de-energized, as had occurred in the past.

Alternative 3 description and reason for rejection
This is a Storm Hardening reliability project construction design, and as such a non-wires alternative ("NWA") solution would not be suitable to address it.

Risk of No Action

Risk 1
The existing overhead system is constructed using double circuit design. During storm conditions, the probability exists that both circuits would be lost for any tree related outage or a motor vehicle

accident on any single pole. Relocating one of the circuits underground will increase reliability and storm hardens the surrounding area.

Non-Financial Benefits

The new underground mainline is required in this area to maintain system reliability and provide additional storm hardening benefits to the surrounding area.

Summary of Financial Benefits and Costs (attach backup)
1. Cost-benefit analysis (if required)
See Selective Undergrounding Resilience Program for more information.
2. Major financial benefits
See Selective Undergrounding Resilience Program for more information.
3. Basis for estimate

Historical Company capital expenditures for similar underground distribution projects. This project will provide benefits for 3,283 customers and the cost per customer to complete this project is only $939.00 per customer.

Project Risks and Mitigation Plan

Risk 1 - Obtain project permits.

Mitigation plan - – Review permitting with the proper public officials early in the process and review town/county/state requirements.

Risk 2 - Obtain long lead time project materials.

Mitigation plan – Materials with long lead times, especially underground cables, are reviewed and orders are placed 1 to 2 years before the project is under construction in order to meet project deadlines.

Technical Evaluation / Analysis
See Selective Undergrounding Resilience Program for more information.

Project Relationships (if applicable)
N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital	$-	$-	$-	$-	$-	$-

2024-2028 Request ($000):
Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028

O&M					
Regulatory Asset					
Capital (Total)	**$-**	**$ 199.5**	**$1,843.0**	**$1,040.3**	
Labor	**$-**	$ 40.0	$129.0	$72.8	
M&S	**$-**		$829.5	$468.0	
Contract Svcs.	**$-**	$100.0	$645.0	$364.0	
Other	**$-**				
Overheads	**$-**	$59.5	$239.5	$135.5	

UG Climate Resilience - Harriman Ckt exits 71-1,2,& 8-13 Project

Electric Engineering

1. Project / Program Summary

Type: ☒ **Project** ☐ **Program**	**Category:** ☒ **Capital** ☐ **O&M** ☐ **Regulatory Asset**
Work Plan Category: ☐ **Regulatory Mandated** ☒ **Operationally Required** ☐ **Strategic**	
Project/Program Title: UG Climate Resilience - Harriman Ckt exits 71-1,2,& 8-13 Project	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1):** 25373812
Status: ☒ **Initiation/Planning** ☐ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: January 2025	**Estimated Date In Service:** June 2027
2024-2028 Funding Request ($000) **Capital:** $1,439.2 **O&M:**	

Work Description:

This is an underground climate resilience project to eliminate a double circuit off road distribution system between Orange and Rockland Utilities, Inc.'s ("O&R" or the "Company") Harriman Substation and River Road for circuit 71-2-13 and circuit 71-8-13 located in Harriman, NY to address poor service reliability on the distribution system associated with both small and large-scale storms and equipment failure. In total, O&R will install 2,600 feet of underground (approximately 1,300ft per circuit). Circuit 71-2-13 will exit out of the Harriman Substation and rise on River Road at or near pole#55199/47821 (approximately 1,300 feet) and circuit 71-8-13 will follow the same path exiting out of the station and riser on River Road at or near pole# 55201/47826 (approximately 1,300 feet). The underground cable system will consist of three-phase 750cu, CNJ 15kv cable, constructed with (6) six six-inch scheduled 40 steel reinforced conduit system concrete encased, with a spare duct system for a potential future circuit for the proposed Harriman Substation expansion. The second part of the overall project will be to eliminate off-road overhead construction for circuit 71-1-13 that also exits out of the Harriman Substation near the Walmart Shopping center (approximately 600 feet). Circuit 71-1-13 that will exit out of the Harriman Substation and rise on pole in the rear of the Walmart Shopping center at or near pole# 55101/47942 (approximately 650 feet). The underground cable system will consist of three-phase 750cu, CNJ 15kv cable, constructed with (4) six inch scheduled 40 steel reinforced conduit system concrete encased. The spare duct system will be for a potential future circuit.

This project will improve system reliability associated with the overhead circuits during storm events. The underground system will provide an alternate path in the event of a contingency issue. The project

design will reduce the exposure on a double circuit pole line configuration and provide an alternate path to reroute a portion of the circuit that is most prone to damage increasing system resilience.

Justification Summary:

The scope of this project will be to storm harden the local distribution system and eliminate off road double circuit pole line configuration in Harriman New York. This project will extend all three station exits (ckt 71-2-13, 71-8-13, & 71-1-13) underground between Harriman station breakers and various riser poles. Circuit 71-8-13 serves Orange County Sewer Treatment Plant, commercial establishments and residential load for 1554 customers. Circuit 71-2-13 serves 1,490 customers which includes a large corporate park plus multiple commercial and residential customers. Circuit 71-1-13, serves 261 customers, plus a large condominium project that is expanding to up to 1,300 customers.

Eliminating the off-road construction with selective undergrounding improves the reliability of all three circuits. During past events the area in the rear of the Harriman Substation has been damaged due to aging equipment and vegetation contact and is difficult to repair due to the proximity of the overhead transmission lines located in the same right of way. On past occasions, the overhead transmission line has had to be de-energized for safety issues in order to complete repairs to the distribution system.

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in the O&R's Climate Change Vulnerability Study ("CCVS") (filed September 2023, in NYPSC Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

As a result of climate change, the O&R service territory is likely to experience more frequent and intense wind and ice events, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation. In particular, the O&R service territory is likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future. Climate projections from the CCVS indicate that warming atmospheric and ocean surface temperatures will likely cause hurricanes in the North Atlantic to become more intense (~5% increase, imply stronger hurricane winds) and have higher rainfall amounts (~10% to 15% increase) relative to historical hurricanes. Projections also show that maximum wind gusts could reach 110 mph in the future. Furthermore, despite the high uncertainty, the potential remains for increased freezing rain frequency and ice accumulation in the O&R service territory in the future.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project does not directly impact greenhouse gas emissions.

This project is in alignment with the Company's goals to meet design standard, upgrade aging infrastructure, increase reliability/resilience, along with increasing hosting capacity to facilitate achievement of the Climate Leadership and Community Protection Act's ("CLCPA") goals. In addition, the project addresses risk for Major Storms by providing storm hardening benefits.

This project serves a disadvantaged community.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
The Company completed a detailed review to identify alternative routes. O&R did not select any alternative as the scope of this project will eliminate 1,900 ft of "off-road' construction. This underground storm hardening project will benefit 3,305 customers and improve public safety.

Alternative 2 description and reason for rejection
O&R did not consider the installation of Hendrix or armless construction, as the scope of this project will be to eliminate off-road overhead construction. The replacement with new overhead construction would not eliminate any of the current challenges that make the existing construction very difficult or near impossible to maintain and operate.

Alternative 3 description and reason for rejection
This is a Storm Hardening reliability project construction design, and as such a non-wires alternative ("NWA") solution would not be suitable.

Risk of No Action

Risk 1
The existing overhead construction is built "off-road" and is very difficult to maintain and operate during storm or blue-sky conditions. Any damage to the current construction could require an extended amount of time to repair and could result in extended customer outages. Installing the exits underground increases reliability/resilience and storm hardens the surrounding area.

Non-Financial Benefits

The new underground mainline is required in this area to maintain system reliability, provide backup capability, and additional storm hardening benefits to the surrounding area.

Summary of Financial Benefits and Costs (attach backup)
1. Cost-benefit analysis (if required)
See Selective Undergrounding Resilience Program for more information.
2. Major financial benefits
See Selective Undergrounding Resilience Program for more information.
3. Basis for estimate

Historical Company capital expenditures for similar underground distribution projects. This project will provide benefits for 3,305 customers and the cost per customer to complete this project is only $436.00 per customer.

Project Risks and Mitigation Plan

Risk 1 - Obtain project permits.

Mitigation plan – Review permitting with the proper public officials early in the process and review town/county/state requirements. Risk 2 - Obtain long lead time project materials. Mitigation plan – Materials with long lead times, especially underground cables, are reviewed and orders are placed 1 to 2 years before the project is under construction in order to meet project deadlines.
Technical Evaluation / Analysis See Selective Undergrounding Resilience Program for more information.
Project Relationships (if applicable) N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital						

2024-2028 Request:
Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)		**$204.6**	**$1,034.4**	**$200.2**	
Labor		$42.0	$72.0	$30.0	
M&S			$465.4	$25.0	
Contract Svcs.		$102.0	$362.0	$100.0	
Other					
Overheads		$60.6	$135.0	$45.2	

UG Climate Resilience - Cty Route 105 - Larkin Road to Ridge Rd. - 10,500ft Project

Electric Engineering

1. Project / Program Summary

Type: ☒ **Project** ☐ **Program**	**Category:** ☒ **Capital** ☐ **O&M** ☐ **Regulatory Asset**
Work Plan Category: ☐ **Regulatory Mandated** ☒ **Operationally Required** ☐ **Strategic**	
Project/Program Title: UG Climate Resilience - Cty Route 105 - Larkin Road to Ridge Rd. - 10,500ft Project	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1):** New

Status: ☐ **Initiation/Planning** ☒ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: January 2024	**Estimated Date In Service:** December 2025
2024-2028 Funding Request ($000) **Capital:** $5,700.0 **O&M:**	

Work Description:

Orange and Rockland Utilities, Inc. ("O&R" or the "Company") requires a new Forest Ave Substation to be in service by no later than 2026 to 2027 to continue to provide safe and reliable service to the municipalities of the Village/Town of Monroe, Town of Woodbury, Village of Palm Tree, and the Village of Harriman. This area of the Company's service territory is primarily supplied from two substations. One substation is located in the Town of Monroe ('Monroe Substation') and the other is located in the Town of Woodbury ('Harriman Substation'). This is an underground climate resilience project to install new underground distribution circuit exits for a temporary mobile substation ('Mobile'), and they will also be utilized when the new substation is built. At this time, the Company has implemented all lower cost area improvements and the Monroe and Harriman Substations are being utilized to their full capacity. Several large subdivisions are proposed or under construction that contain residential homes as well as areas reserved for planned commercial space.

The Mobile installation will be needed to provide a power source "bridge" until O&R constructs the new Forest Ave Substation. Once the new Forest Ave Substation goes into service, O&R will remove the mobile substation. This project scope requires the installation of two new underground distribution circuits fed from the Mobile installation on Larkin Drive. The first new underground circuit will rise on a new pole on County Route 105 near Larkin Drive (approximately 600 ft), the 2nd under circuit fed from the mobile will proceed over Rt 17 to County Rt 105 near the intersection of Ridge Road (approximately 10,000 ft). This project will include spare conduit system for three additional future underground circuits. After the substation is completed, these two underground circuits will remain in service although they will be transferred to the new substation. The underground cable systems will consist of three-phase 750cu, CNJ 15kv cable, constructed with eight (8) six inch scheduled 40 steel reinforced conduit system concrete encased.

Justification Summary:

The existing infrastructure in the area will not be able to support the forecasted load growth. Three Monroe circuits supplying the area currently fail to meet the Company's distribution design standard. In addition, the planned projects will likely cause the Monroe Substation banks to fail the Company's distribution design standard by 2028. This assumes the new housing units will use natural gas for both heating and cooking requirements. If natural gas is not available, the customers will be required to use electricity for heating, cooking, hot water, and laundry. This would result in a winter peaking load area that could be significantly higher than the area summer peak.

Based on the current forecast, by 2026, the Company will need to have the new Forest Avenue Substation in operation. The Mobile installation will be needed to "bridge" the time frame to get past two summer periods (2025/2026) to support the new load growth, provide load relief to the Monroe and Harriman Substations, and to improve reliability to the Woodbury area north of RT 17 and the Town of Palm Tree. These two underground circuits will serve a combined 2,826 customers, approximately 250amps per circuit. In total the Mobile is expected to serve approximately 11MW of

load until the new Forest Substation has been constructed and in service. These two new mobile circuits will storm harden the local distribution system, add addition circuit capacity, and provide an alternate distribution path in the event of equipment failure, lightning, motor vehicle accident or vegetation contact.

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in the O&R's Climate Change Vulnerability Study ("CCVS") (filed September 2023, in NYPSC Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

As a result of climate change, the O&R service territory is likely to experience more frequent and intense wind and ice events, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation. In particular, the O&R service territory is likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future. Climate projections from the CCVS indicate that warming atmospheric and ocean surface temperatures will likely cause hurricanes in the North Atlantic to become more intense (~5% increase, imply stronger hurricane winds) and have higher rainfall amounts (~10% to 15% increase) relative to historical hurricanes. Projections also show that maximum wind gusts could reach 110 mph in the future. Furthermore, despite the high uncertainty, the potential remains for increased freezing rain frequency and ice accumulation in the O&R service territory in the future.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project does not directly impact greenhouse gas emissions.

This project serves a disadvantaged community ("DAC").

This project is in alignment with the Company's goals to meet design standard, upgrade aging infrastructure, increase reliability/resilience, along with increasing hosting capacity to facilitate achievement of the Climate Leadership and Community Protection Act's ("CLCPA") goals. In addition, this project addresses risk for Major Storms by providing storm hardening benefits.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

O&R considered the expansion of either the existing Monroe or Harriman Substations. Neither substation could be expanded to support the additional equipment needed. In addition, O&R preferred the Forest Avenue location, as it is more centrally located to the load area being served. Once completed, the new Forest Avenue Substation will serve the majority of the load north of RT 17. This will provide relief to both Monroe Substation and Harriman Substation which will free up capacity for those stations to serve primarily the load south of RT 17.

Alternative 2 description and reason for rejection

O&R considered a non-wires alternative ("NWA") but concluded that an NWA is not a viable solution. This is due to the lack of real estate to house potential batteries at the correct location particularly in the

KJ area north of RT 17 and the magnitude and timing of load growth. After applying the NWA suitability criteria, the Company concluded that an NWA could not be completed in a timely fashion.

Alternative 3 description and reason for rejection

Risk of No Action

Risk 1
The existing infrastructure in the area will not be able to support the proposed growth. Three Monroe circuits supplying the area currently fail to meet the Company's distribution design standard. In addition, the planned projects will likely cause the Monroe Substation banks to fail the Company's Distribution Design standard by 2028.

Risk 2
The projected loads from area projects in some areas will exceed the thermal rating of existing equipment. To prevent equipment overloads would require peak load shedding and/or the inability for the Company to serve new customer connections.

Non-Financial Benefits

1. Analysis of development plans and the timing of approved projects show that demand will likely exceed the existing infrastructures capability to serve the projected load by 2026. The new substation will allow the Company to meet the projected electric demand of the local communities.
2. A new substation is required in this area to maintain/improve system reliability, meet Distribution Design Standards for the area stations/circuit and NYPSC reliability criteria (*e.g.*, SAIFI, CAIDI).
3. The new station will provide the capacity needed to support projected new business load, as well as the future load growth from beneficial electrification of heating and transportation. Constructing the new station will help achieve the clean energy goals outlined in the CLCPA by providing the 'headroom' needed to support the summer and winter peaking loads of the area communities.

Summary of Financial Benefits and Costs (attach backup)
1. Cost-benefit analysis (if required)
See Selective Undergrounding Resilience Program for more information.
2. Major financial benefits
See Selective Undergrounding Resilience Program for more information.
3. Basis for estimate

Historical Company capital expenditures for similar underground distribution projects. This project will provide benefits for 2,826 customers and the cost per customer to complete this project is $2,017.00 per customer.

Project Risks and Mitigation Plan

Risk 1 - Obtain project permits.

Mitigation plan - Review permitting with the proper public officials early in the process and review town/county/state requirements.

Risk 2 - Obtain long lead time project materials. Mitigation plan – Materials with long lead times, especially underground cables, are reviewed and orders are placed 1 to 2 years before the project is under construction in order to meet project deadlines.
Technical Evaluation / Analysis See Selective Undergrounding Resilience Program for more information.
Project Relationships (if applicable) N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital						

2024-2028 Request ($000):
Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)	**$3,500.0**	**$2,200.0**			
Labor	$245.0	$154.0			
M&S	$1,575.0	$990.0			
Contract Svcs.	$1,225.0	$770.0			
Other					
Overheads	$455.0	$286.0			

UG Climate Resilience - Sparkill - New Exit 50-5-13 - Rt 340 5,000ft Project

Electric Engineering

1. Project / Program Summary

Type: ☒ **Project** ☐ **Program**	**Category:** ☒ **Capital** ☐ **O&M** ☐ **Regulatory Asset**
Work Plan Category: ☐ **Regulatory Mandated** ☒ **Operationally Required** ☐ **Strategic**	
Project/Program Title: UG Climate Resilience - Sparkill - New Exit 50-5-13 - Rt 340 5,000ft Project	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1):** 26218939
Status: ☒ **Initiation/Planning** ☐ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: January 2025	**Estimated Date In Service: December 2026**

2024-2028 Funding Request ($000) **Capital: $3,000.0** **O&M:**	

Work Description:

This is an underground climate resilience project to install a new distribution circuit out of the Sparkill Substation along Route 340 in Sparkill, NY. This project will address poor service reliability on Orange and Rockland Utilities, Inc.'s ("O&R" or the "Company") distribution system associated with both small- and large-scale storms and equipment failures. This new mainline (600Amp) underground cable system will house circuit 50-5-13 and will span approximately 5,000 feet from the new station breaker 50-5-2b to pole# 61156/37176 located on Route 340. The underground cable systems will consist of three-phase 750cu, CNJ 15kv cable, constructed with (4) six-inch scheduled 40 steel reinforced conduit system concrete encased, with a spare duct system for a potential future circuit. Installation of the underground system was the best option to improve reliability.

Justification Summary:

This project will storm harden the local distribution system, add addition circuit capacity with new circuit 50-5-13, and provide an alternate distribution path to refeed circuits 30-5-13 and 28-7-13 in the event of equipment failure, lightning, motor vehicle accident or vegetation contact. This project will benefit circuit 30-5-13 which serves 468 customers and circuit 28-7-13 which serves 504 customers. Currently the peak loading on circuit 50-3-13 is approaching conductor relief rating. The Company will construct this new underground station exit and will split existing circuit 50-3-13 into two separate circuits. The existing circuit presently serves 759 customers, with four large commercial customers. Circuit 50-3-13 is currently operating at 400amps. Upon completion of the new station breaker and new station exit both circuits will operate at 200 amps. O&R completed a detailed review to identify possible alternative routes. However no options are available, the project will benefit local customers in the Sparkill and Palisades, New York area.

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in the O&R's Climate Change Vulnerability Study ("CCVS") (filed September 2023, in NYPSC Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

As a result of climate change, the O&R service territory is likely to experience more frequent and intense wind and ice events, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation. In particular, the O&R service territory is likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future. Climate projections from the CCVS indicate that warming atmospheric and ocean surface temperatures will likely cause hurricanes in the North Atlantic to become more intense (~5% increase, imply stronger hurricane winds) and have higher rainfall amounts (~10% to 15% increase) relative to historical hurricanes. Projections also show that maximum wind gusts could reach 110 mph in the future. Furthermore, despite the high uncertainty, the potential remains for increased freezing rain frequency and ice accumulation in the O&R service territory in the future.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project does not have any direct impact on greenhouse gas emissions.

This project will not directly impact disadvantaged communities.

This project is in alignment with the Company's goals to meet design standard, upgrade aging infrastructure, increase reliability/resilience, along with increasing hosting capacity to facilitate achievement of the Climate Leadership and Community Protection Act's ("CLCPA") goals. In addition, the project addresses Corporate risk for Major Storms by providing storm hardening benefits.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
O&R completed a detailed review to identify alternative routes. However, no options are available and this project will benefit local customers. A new distribution feeder out of Sparkill Substation is the only solution.
Alternative 2 description and reason for rejection
O&R did not consider Hendrix construction as the Company is trying to eliminate double circuit overhead construction and a portion of the route would mean the installation of a triple overhead circuit.
Alternative 3 description and reason for rejection
This is a Storm Hardening reliability project construction design, and as such a non-wires alternative ("NWA") solution would not be suitable.

Risk of No Action

Risk 1
The existing overhead conductor is approaching the conductor relief rating. If not resolved, the conductor will either start to burn down or voltage conditions will increase. O&R expects that future loading will increase on the circuit, due to the expansion of a local data storage facility.

Non-Financial Benefits

The project is required in this area to maintain system reliability, provide backup capability, and additional storm hardening benefits to the surrounding area.

Summary of Financial Benefits and Costs (attach backup)
1. Cost-benefit analysis (if required)
See Selective Undergrounding Resilience Program for more information.
2. Major financial benefits
See Selective Undergrounding Resilience Program for more information.
3. Basis for estimate

Historical Company capital expenditures for similar underground distribution projects. This project will provide benefits for 1,731 customers and the cost per customer to complete this project is $1,733.00 per customer.
Project Risks and Mitigation Plan Risk 1 Obtain project permits. Mitigation plan – Review permitting with the proper public officials early in the process and review town/county/state requirements. Risk 2 Obtain long lead time project materials. Mitigation plan – Materials with long lead times, especially underground cables, are reviewed and orders are placed 1 to 2 years before the project is under construction in order to meet project deadlines.
Technical Evaluation / Analysis See Selective Undergrounding Resilience Program for more information.
Project Relationships (if applicable) N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital						

2024-2028 Request($000):

Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)		**$1,500.0**	**$1,500.0**		
Labor		$105.0	$95.0		
M&S		$675.0	$700.0		
Contract Svcs.		$525.0	$510.0		
Other					
Overheads		$195.0	$195.0		

UG Climate Resilience - Mongaup - Plank Road & Mill Road - 2-1-13 8500ft

Electric Engineering

1. Project / Program Summary

Type: ☒ Project ☐ Program	**Category: ☒ Capital ☐ O&M ☐ Regulatory Asset**
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: UG Climate Resilience - Mongaup - Plank Road & Mill Road - 2-1-13 8500ft	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1):** New
Status: ☒ Initiation/Planning ☐ In-Progress (Projects Only) ☐ On-going (Programs Only)	
Estimated Start Date: January 2026	**Estimated Date In Service: June 2028**
2024-2028 Funding Request ($000) **Capital: $5,000.0** **O&M:**	

Work Description:

This is an underground climate resilience project to eliminate overhead construction on Plank Road in Forestburgh, New York to address poor service reliability on the Orange and Rockland Utilities, Inc. ("O&R" or the "Company") distribution system associated with both small and large-scale storms and equipment failure. The scope of this project will replace approximately 8,500 feet of overhead distribution with underground main-line distribution system just outside the Mongaup Substation (Grid# 38247/55891) along Plank Road to Mill Road then rise on a new pole (Grid# 38586/56468) on State Highway Route 42. The underground cable system will consist of three-phase 750Cu, CNJ 15kv cable, constructed with eight (8) six inch scheduled 40 steel reinforced conduit system concrete encased, with a spare duct system for three potential future distribution circuits. Installation of the underground system is the best option to improve reliability and enhance system resiliency for the Forestburgh, New York area.

Justification Summary:

The scope of this project will be a storm hardening project that will improve poor reliability associated with the existing distribution circuit during storm events. The underground system will provide an alternate path in the event of a contingency issue. This area has seen three to four system outages per year as a result of storm activity. The majority of those interruptions occur along Plank Road. This project provides an alternate path to reroute a portion of the circuit that is most prone to damage. The Mongaup Substation has one distribution circuit (Ckt: 2-1-13) that serves approximately 800 customers. In the future, this circuit will serve an additional 2,500 homes in the Lost Lake area, located at the very edge of the O&R service territory, approximately 8 miles from the substation.

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in the O&R's Climate Change Vulnerability Study ("CCVS") (September 2023, Case Number 22-E-0222), it is anticipated that many of these events will increase in frequency and/or severity as a result of climate change, to include:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and

- Multiple extreme weather events (occurring coincidently or sequentially).

As a result of climate change, the O&R service territory is likely to experience more frequent and intense wind and ice events, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation. In particular, the O&R service territory is likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future. Climate projections from the CCVS indicate that warming atmospheric and ocean surface temperatures will likely cause hurricanes in the North Atlantic to become more intense (~5% increase, imply stronger hurricane winds) and have higher rainfall amounts (~10% to 15% increase) relative to historical hurricanes. Projections also show that maximum wind gusts could reach 110 mph in the future. Furthermore, despite the high uncertainty, the potential remains for increased freezing rain frequency and ice accumulation in the O&R service territory in the future.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project does not have any direct impact on greenhouse gas emissions.

This project does not impact any disadvantaged communities.

This project is in alignment with the Company's goals to meet design standard, upgrade aging infrastructure, increase reliability/resilience, along with increasing hosting capacity to promote the Climate Leadership and Community Protection Act's ("CLCPA") goals. In addition, the project addresses Corporate risk for Major Storms by providing storm hardening benefits.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
The existing overhead construction between Mongaup Substation and State Highway Rt 42, was built with cross arm construction. The area is very heavily treed with huge tree canopy that encompasses both sides of the road. The installation of Hendrix spacer cable was not the preferred choice, as in the near future O&R will be installing (3) additional distribution circuits associated with the Mongaup Substation upgrade. As a result, the Company concluded that undergrounding the overhead conductor is the best option.

Alternative 2 description and reason for rejection
This is a Storm Hardening reliability project construction design, and as such a non-wires alternative ("NWA") solution would not be suitable to address it.

Risk of No Action

Risk 1
During storm conditions, the probability exists that the overhead circuit would be lost for any tree related outage or a motor vehicle accident ("MVA") on any single pole. Relocating the circuit underground increases reliability and storm hardens the surrounding area.

Non-Financial Benefits

The new underground mainline is required in this area to maintain system reliability and provide additional storm hardening benefits to the surrounding area.

Summary of Financial Benefits and Costs (attach backup) 1. Cost-benefit analysis (if required) See Selective Undergrounding Resilience Program for more information. 2. Major financial benefits See Selective Undergrounding Resilience Program for more information. 3. Basis for estimate Historical Company capital expenditures for similar underground distribution projects. This project will provide benefits for 800 existing customers and 2500 future customers and the cost per customer to complete this project is $1,515.00 per customer.
Project Risks and Mitigation Plan Risk 1 - Obtain project permits. Mitigation plan – Review permitting with the proper public officials early in the process and review town/county/state requirements. Risk 2 - Obtain long lead time project materials. Mitigation plan - Materials with long lead times, especially underground cables, are review and orders are placed 1 to 2 years before project is under construction in order to meet project deadlines.
Technical Evaluation / Analysis See Selective Undergrounding Resilience Program for more information.
Project Relationships (if applicable) N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital						

2024-2028 Request ($000):

Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)			**$1,000.0**	**$3,000.0**	**$1,000.0**
Labor			$140.0	$210.0	$70.0
M&S			$300.0	$1,350.0	$350.0
Contract Svcs.			$350.0	$1,050.0	$400.0
Other					

Overheads			$210.0	$390.0	$180.0

UG Climate Resilience - Orangeburg - 54-2-13 - ALUF Plastics 2,750ft Project

Electric Engineering

1. Project / Program Summary

Type: ☒ **Project** ☐ **Program**	**Category:** ☒ **Capital** ☐ **O&M** ☐ **Regulatory Asset**
Work Plan Category: ☐ **Regulatory Mandated** ☒ **Operationally Required** ☐ **Strategic**	
Project/Program Title: UG Climate Resilience - Orangeburg - 54-2-13 - ALUF Plastics 2,750ft Project	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1):** New
Status: ☒ **Initiation/Planning** ☐ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: January 2025	**Estimated Date In Service: December 2026**
2024-2028 Funding Request ($000) **Capital:** $1,500.0 **O&M:**	

Work Description:

This is an underground climate resilience project to eliminate overhead distribution along Mountainview Avenue to the rear of Aluf Plastics in Orangeburg, NY (circuit 54-2-13) to address poor service reliability on Orange and Rockland Utilities, Inc.'s ("O&R" or the "Company") distribution system associated with both small and large-scale storms and equipment failure. This project will replace approximately 2,750 feet of overhead distribution, which is backyard construction with underground main-line distribution system between disconnect pole# 60557/38328 and pole # 60552/38515 by Glenshaw Avenue. The design should follow existing gas main route. The underground cable systems will consist of three-phase 750cu, CNJ 15kv cable, constructed with two (2) six inch scheduled 40 steel reinforced conduit system concrete encased. This project will eliminate overhead single circuit configuration that is off road and is inaccessible by line trucks.

This project will improve system reliability associated with the overhead circuit during storm events. This project design will also reduce overhead exposure and provide an alternate path to reroute a portion of circuit 54-2-13 underground that is prone to damage, thereby increasing system resilience.

Justification Summary:

This project will storm harden the local distribution system and overhead main line along the Aluf Plastics facility in Orangeburg, NY. Circuit 54-2-13 serves 398 customers, a majority of which are commercial/industrial customers. This circuit also provides backup capability to circuit 54-3-13 which serves 82 customers and circuit 54-4-13 which serves 353 customers. This project will improve reliability issues associated with the overhead distribution system during storm events. The underground system will provide an alternate path in the event of a contingency issue. This area is old construction and has been damaged multiple times as a result of equipment failure, aging infrastructure, and vegetation contact.

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in O&R's Climate Change Vulnerability Study ("CCVS") (filed September 2023, in

NYPSC Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

As a result of climate change, the O&R service territory is likely to experience more frequent and intense wind and ice events, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation. In particular, the O&R service territory is likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future. Climate projections from the CCVS indicate that warming atmospheric and ocean surface temperatures will likely cause hurricanes in the North Atlantic to become more intense (~5% increase, imply stronger hurricane winds) and have higher rainfall amounts (~10% to 15% increase) relative to historical hurricanes. Projections also show that maximum wind gusts could reach 110 mph in the future. Furthermore, despite the high uncertainty, the potential remains for increased freezing rain frequency and ice accumulation in the O&R service territory in the future.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project does not have any direct impact on greenhouse gas emissions.

This project does not directly serve a disadvantaged community.

This project is in alignment with the Company's goals to meet design standard, upgrade aging infrastructure, increase reliability/resilience, along with increasing hosting capacity to facilitate achievement of the Climate Leadership and Community Protection Act's ("CLCPA") goals. In addition, the project addresses risk for Major Storms by providing storm hardening benefits.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
O&R completed a detailed review to identify alternative routes. However, no options are available, and the project will benefit local customers. The underground mainline is the only solution.

Alternative 2 description and reason for rejection
O&R did not consider the installation of Hendrix or armless construction, as the scope of this project will be to eliminate off-road overhead construction. The replacement with new overhead construction would not eliminate any of the current challenges that make the existing construction very difficult or near impossible to maintain and operate.

Alternative 3 description and reason for rejection
This is a Storm Hardening reliability project construction design, and as such a non-wires alternative ("NWA") solution would not be suitable.

Risk of No Action

Risk 1
The existing overhead construction is built "off-road" and is very difficult to maintain and operate during storm or blue-sky conditions. Any damage to the current construction could require an extended amount of time to repair and could result in extended customer outages. Installing this section underground increase reliability/resilience and storm hardens the surrounding area.

Non-Financial Benefits

The project is required in this area to maintain system reliability, provide backup capability, and additional storm hardening benefits to the surrounding area.

Summary of Financial Benefits and Costs (attach backup)
1. Cost-benefit analysis (if required)
See Selective Undergrounding Resilience Program for more information.
2. Major financial benefits
See Selective Undergrounding Resilience Program for more information.
3. Basis for estimate

Historical Company capital expenditures for similar underground distribution projects. This project will provide benefits for 833 customers and the cost per customer to complete this project is $1,801.00 per customer.

Project Risks and Mitigation Plan

Risk 1 – Obtain project permits.

Mitigation plan – Review permitting with the proper public officials early in the process and review town/county/state requirements.

Risk 2 – Obtain long lead time project materials.

Mitigation plan – Materials with long lead times, especially underground cables, are reviewed and orders are placed 1 to 2 years before the project is under construction in order to meet project deadlines.

Technical Evaluation / Analysis
See Selective Undergrounding Resilience Program for more information.

Project Relationships (if applicable)
N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						

Regulatory Asset						
Capital						

2024-2028 Request($000):
Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)		**$500.0**	**$1,000.0**		
Labor		$70.0	$70.0		
M&S		$200.0	$450.0		
Contract Svcs.		$175.0	$350.0		
Other					
Overheads		$55.0	$130.0		

UG Climate Resilience - West Haverstraw - High Street/Main Street/Suffern Lane 4000ft

Electric Engineering

1. Project / Program Summary

Type: ☒ **Project** ☐ **Program**	**Category:** ☒ **Capital** ☐ **O&M** ☐ **Regulatory Asset**
Work Plan Category: ☐ **Regulatory Mandated** ☒ **Operationally Required** ☐ **Strategic**	
Project/Program Title: UG Climate Resilience - West Haverstraw - High Street/Main Street/Suffern Lane 4000ft	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1):** New
Status: ☒ **Initiation/Planning** ☐ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: January 2025	**Estimated Date In Service:** June 2027
2024-2028 Funding Request ($000) **Capital:** $2,400.0 **O&M:**	

Work Description:

This is an underground climate resilience project to eliminate a double circuit distribution system along Main Street to Suffern Lane in Garnerville, NY (Ckt: 27-6-13) to address poor service reliability on Orange and Rockland Utilities, Inc.'s ("O&R" or the "Company") distribution system associated with both small- and large-scale storms and equipment failure. This project will replace approximately 4,000 feet of overhead distribution with underground main-line distribution system between pole# 59228/43797 on High Street and Grid# 59165/43998 (new pole) on Suffern Lane in Garnerville, NY. The underground cable system will consist of three-phase 750cu, CNJ 15kv cable, constructed with two (2) six inch scheduled 40 steel reinforced conduit system concrete encased. Currently the Company has a double circuit configuration on Main Street, and the project will eliminate this double circuit. This area consists of old construction and has been damaged previously as a result of equipment failure due to aging infrastructure, lightning, and motor vehicle accidents. Undergrounding this portion of the circuit will improve reliability and provide an alternate path to reroute a portion of the circuit that is most prone to damage.

Justification Summary:

The scope of this project will be to storm harden the local distribution system and eliminate a double circuit configuration along High Street, Main Street, and Suffern Lane in Garnerville, NY. This project will replace approximately 4,000 feet of overhead distribution with an underground main-line distribution system. This project will improve reliability issues associated with the overhead distribution system during storm events. In total 1,995 customers (Ckt: 27-6-13 – 1,133 customers & 27-1-13 – 862 customers) will benefit from this project. Eliminating the double circuit will improve the reliability for customers in the West Haverstraw/Garnerville area.

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in O&R's Climate Change Vulnerability Study ("CCVS") (filed September 2023, in NYPSC Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

As a result of climate change, the O&R service territory is likely to experience more frequent and intense wind and ice events, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation. In particular, the O&R service territory is likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future. Climate projections from the CCVS indicate that warming atmospheric and ocean surface temperatures will likely cause hurricanes in the North Atlantic to become more intense (~5% increase, imply stronger hurricane winds) and have higher rainfall amounts (~10% to 15% increase) relative to historical hurricanes. Projections also show that maximum wind gusts could reach 110 mph in the future. Furthermore, despite the high uncertainty, the potential remains for increased freezing rain frequency and ice accumulation in the O&R service territory in the future.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project does not have any direct impact on greenhouse gas emissions.

This project is in alignment with the Company's goals to meet design standard, upgrade aging infrastructure, increase reliability/resilience, along with increasing hosting capacity to facilitate achievement of the Climate Leadership and Community Protection Act's ("CLCPA") goals. In addition, the project addresses Corporate risk for Major Storms by providing storm hardening benefits.

This project serves a disadvantaged community.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

O&R completed a detailed review to identify alternative routes. However, no options are available, and the project will benefit local customers. The underground mainline is the only solution.

Alternative 2 description and reason for rejection
O&R did not consider the installation of Hendrix or armless construction, as the scope of this project will be to eliminate off-road overhead construction. The replacement with new overhead construction would not eliminate any of the current challenges that make the existing construction very difficult to maintain and operate.

Alternative 3 description and reason for rejection
This is a Storm Hardening reliability project construction design, and as such a non-wires alternative ("NWA") solution would not be suitable.

Risk of No Action

Risk 1
The existing overhead system is constructed using double circuit design. During storm conditions, the probability exists that both circuits would be lost for any tree related outage or a motor vehicle accident ("MVA") on any single pole. Relocating one of the circuits underground increases reliability and storm hardens the surrounding area. The installation of an additional circuit will provide load relief to the area as well.

Non-Financial Benefits

The new underground mainline is required in this area to maintain system reliability and provide additional storm hardening benefits to the surrounding area.

Summary of Financial Benefits and Costs (attach backup)
1. Cost-benefit analysis (if required)
See Selective Undergrounding Resilience Program for more information.
2. Major financial benefits
See Selective Undergrounding Resilience Program for more information.
3. Basis for estimate

Historical Company capital expenditures for similar underground distribution projects. This project will provide benefits for 1,995 customers and the cost per customer to complete this project is $1,203.00 per customer.

Project Risks and Mitigation Plan

Risk 1 – Obtain project permits.

Mitigation plan – Review permitting with the proper public officials early in the process and review town/county/state requirements.

Risk 2 – Obtain long lead time project materials.

Mitigation plan – Materials with long lead times, especially underground cables, are reviewed and orders are placed 1 to 2 years before the project is under construction in order to meet project deadlines.

Technical Evaluation / Analysis See Selective Undergrounding Resilience Program for more information.
Project Relationships (if applicable) N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital						

2024-2028 Request:
Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)		**$800.0**	**$1,200.0**	**$400.0**	
Labor		$85.0	$85.0	$30.0	
M&S		$325.0	$540.0	$180.0	
Contract Svcs.		$325.0	$420.0	$145.0	
Other					
Overheads		$65.0	$155.0	$45.0	

UG Climate Resilience - Wurtsboro 109-4-34 Pine St. & Route 209 5900ft

Electric Engineering

1. Project / Program Summary

Type: ☒ **Project** ☐ **Program**	**Category:** ☒ **Capital** ☐ **O&M** ☐ **Regulatory Asset**
Work Plan Category: ☐ **Regulatory Mandated** ☒ **Operationally Required** ☐ **Strategic**	
Project/Program Title: UG Climate Resilience - Wurtsboro 109-4-34 Pine St. & Route 209 5900ft	
Project/Program Manager: Wayne Banker	**Project/Program Number (Level 1):** New
Status: ☒ **Initiation/Planning** ☐ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: January 2026	**Estimated Date In Service:** December 2027
2024-2028 Funding Request ($000) **Capital:** $3,900.0 **O&M:**	
Work Description: This is an underground climate resilience project to provide a more direct and reliable source to Summitville Substation to address poor service reliability on the distribution system associated with	

both small- and large-scale storms and equipment failure. This project will install approximately 5,900 feet of underground main-line distribution between grid# 45965/57331 (Sullivan St at the intersection of Burger La) and grid # 45970/57654 located on Rt 209 in Wurtsboro, NY. This project will improve reliability issues associated with Orange and Rockland Utilities, Inc.'s ("O&R" or the "Company") overhead distribution system during storm events. The underground system will provide an alternate path in the event of a contingency issue. The underground cable system will consist of three-phase 750cu, CNJ 35kv cable, constructed with six (6) six inch scheduled 40 steel reinforced conduit system concrete encased, the spare duct system will be for a potential circuit exits for the future Wurtsboro substation. The existing area overhead system is old construction and has been damaged as result of equipment failure, aging infrastructure, tree contact, and motor vehicle accidents. Undergrounding the existing alternate feed and making it permanent will improve reliability and retain an alternate path to the station.

Justification Summary:

The scope of this project will be to storm harden the local distribution system and provide an underground main line along Pine Street and Rt 209 in Wurtsboro, NY to provide a more reliable source to Summitville Substation. Circuit 10-2-13 serves 788 customers. Per the NY Northern Division Worst Performing Circuit list, circuit 10-2-13 ranks 8th out of 66 Northern NY distribution circuits. Project will improve reliability issues associated with the overhead distribution system during storm events. In total 788 customers will benefit from this project. Summitville Substation has experienced frequent momentary and prolonged outages due to the exposure of the current source and having no backup.

This project will increase the resiliency of the distribution system in the face of extreme weather events. As documented in O&R's Climate Change Vulnerability Study ("CCVS") (filed September 2023, in NYPSC Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

As a result of climate change, the O&R service territory is likely to experience more frequent and intense wind and ice events, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation. In particular, the O&R service territory is likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future. Climate projections from the CCVS indicate that warming atmospheric and ocean surface temperatures will likely cause hurricanes in the North Atlantic to become more intense (~5% increase, imply stronger hurricane winds) and have higher rainfall amounts (~10% to 15% increase) relative to historical hurricanes. Projections also show that maximum wind gusts could reach 110 mph in the future. Furthermore, despite the high uncertainty, the potential remains for increased freezing rain frequency and ice accumulation in the O&R service territory in the future.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project does not have any direct impact on greenhouse gas emissions.

This project does not directly serve a disadvantaged community.

This project is in alignment with the Company's goals to meet design standard, upgrade aging infrastructure, increase reliability/resilience, along with increasing hosting capacity to facilitate achievement of the Climate Leadership and Community Protection Act's ("CLCPA") goals. In addition, the project addresses risk for Major Storms by providing storm hardening benefits.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
O&R completed a detailed review to identify potential overhead alternative routes. However, no options are available, and this project will benefit local customers. The underground distribution dip was the only solution. In total 788 customers will benefit from this selective underground resilience project with improved public safety.

Alternative 2 description and reason for rejection
Hendrix construction was not considered as the Company is trying to eliminate double circuit overhead construction and a portion of the route would mean the installation of a triple overhead circuit.

Alternative 3 description and reason for rejection
This is a Storm Hardening reliability project construction design, and as such a non-wires alternative ("NWA") solution would not be suitable.

Risk of No Action

Risk 1
The existing overhead system is constructed using a double circuit design. During storm conditions, the probability exists that both circuits would be lost for any tree related outage or a motor vehicle accident ("MVA") on any single pole. Relocating a portion of an overhead circuit underground and providing a more direct source increases reliability by storm hardening the surrounding area.

Non-Financial Benefits

The project is required in this area to maintain system reliability, provide backup capability, and additional storm hardening benefits to the surrounding area.

Summary of Financial Benefits and Costs (attach backup)
1. Cost-benefit analysis (if required)
See Selective Undergrounding Resilience Program for more information.
2. Major financial benefits
See Selective Undergrounding Resilience Program for more information.
3. Basis for estimate

Historical Company capital expenditures for similar underground distribution projects. This project will provide benefits for 788 customers and the cost per customer to complete this project is $4,949.00 per customer.

Project Risks and Mitigation Plan Risk 1 – Obtain project permits. Mitigation plan – Review permitting with the proper public officials early in the process and review town/county/state requirements. Risk 2 – Obtain long lead time project materials. Mitigation plan – Materials with long lead times, especially underground cables, are reviewed and orders are placed 1 to 2 years before the project is under construction in order to meet project deadlines.
Technical Evaluation / Analysis See Selective Undergrounding Resilience Program for more information.
Project Relationships (if applicable) N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital						

2024-2028 Request ($000):
Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)			**$1,300.0**	**$2,600.0**	
Labor			$91.0	$182.0	
M&S			$585.0	$1,170.0	
Contract Svcs.			$455.0	$910.0	
Other					
Overheads			$169.0	$338.0	

Line 705 (New Line 705 Underground, Burns Terminal, West Nyack 2nd Autobank) Project

Electric Engineering

1. Project / Program Summary

Type: ☒ Project ☐ Program	**Category: ☒ Capital ☐ O&M ☐ Regulatory Asset**

Work Plan Category: ☐ **Regulatory Mandated** ☒ **Operationally Required** ☐ **Strategic**	
Project/Program Title: Line 705 (New Line 705 Underground, Burns Terminal, West Nyack 2nd Autobank) Project	
Project/Program Manager: W. Banker	**Project/Program Number (Level 1):** 22594274, 22594275, 22594281
Status: ☒ **Initiation/Planning** ☐ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: 2019	**Estimated Date In Service:** December 2026
2024-2028 Funding Request ($000) **Capital:** $58,554.5 **O&M:**	

Work Description:

This project involves Orange and Rockland Utilities, Inc.'s ("O&R" or the "Company") installation of a new 138 kV underground transmission line that will span approximately 5.5 miles entirely within the Town of Clarkstown, in Rockland County, NY to provide additional electric power capacity to the transmission system and customers in the southern Rockland County and northern Bergen County areas. This Project is known as Line 705 and will originate at the Burns Substation located in the Nanuet and terminate at the West Nyack Substation located in West Nyack. This Project will require alterations at the Burns and West Nyack Substations to accommodate Line 705. There will be a termination structure at each substation to transition the underground cable to an overhead connection. The overhead connection will then interconnect with newly installed 138 kV circuit breakers, disconnect switches, and a 138 kV aluminum bus. The West Nyack terminal will also feed a new 196 MVA 138/69 kV autotransformer and interconnect with the existing 69 kV copper bus. To accommodate the new equipment, the existing West Nyack Substation fence line will extend approximately 60 feet further to the south side of the property into the transmission right-of-way ("ROW").

The Company will complete civil/site work as part of this Project including grading; structure and equipment foundations; grounding; substation yard stone surfacing; paved access roads; fencing; and possibly landscaping. As part of the detailed design and permitting, the Company will determine whether there is a need for landscaping and additional stormwater drainage facilities.

Next steps include the development of an Environmental Management and Construction Plan ("EM&CP"). Following EM&CP approval, the Company will submit for permits and easements, which have already been prefilled and are awaiting EM&CP approval for submission. Pending these approvals, the Company currently anticipates beginning civil construction in spring 2024 with an in-service date of spring 2026.

Justification Summary:

The O&R Transmission System in the southeastern Rockland County area is being stressed by load growth, including the addition of large data centers in the Orangetown area. This load pocket is presently served from the end of the 138 kV system from the north, which includes Line 56 (Lovett to Bowline), Line 561 (Bowline to Congers), Line 563 (Congers to Snake Hill Road), Line 562 (Snake Hill Road to West Nyack), Line 702 (Burns to Oak Street), and additionally from a 69kV loop system from the south comprised of Line 652 (South Mahwah to Upper Saddle River), Line 654 (Upper Saddle River to Summit Avenue), Line 656 (Summit Avenue to Montvale), and Line 658 (Montvale to Harings Corner). The southeastern load pocket electric delivery system is failing O&R's design standards.

Continued load growth without a near-term solution increases the risk and likelihood of unplanned outages due to capacity overload, causing widespread outages.

Continued operation of the O&R transmission system in its existing configuration will have significant short- and long-term negative impacts on the transmission lines on the system. Currently, the loss of Line 561 would load Line 652 to approximately 131 MW, approaching its Long-Term Emergency ("LTE") rating of 133 MW. The conditions resulting from the loss of Line 561 would load Line 652 above its LTE rating, as anticipated load increases materialize. Voltage violations will also worsen with the increasing load, requiring system voltage support.

Furthermore, O&R's electric transmission lines are exposed to potential outages and interruptions due to wind and ice events. As a result of climate change, the O&R service territory is likely to experience more frequent and intense wind and ice events, which can damage overhead lines through failing or wind-blown debris or contact with surrounding vegetation. In particular, the O&R service territory is likely to experience higher wind speeds and gusts during tropical cyclones, extratropical cyclones, and thunderstorms in the future. Climate projections set forth in the Company's Climate Change Vulnerability Study indicate that warming atmospheric and ocean surface temperatures will likely cause hurricanes in the North Atlantic to become more intense (~5% increase, imply stronger hurricane winds) and have higher rainfall amounts (~10% to 15% increase) relative to historical hurricanes. Projections also show that maximum wind gusts could reach 110 mph in the future. Furthermore, despite the high uncertainty, the potential remains for increased freezing rain frequency and ice accumulation in the O&R service territory in the future.

The underground installation of Line 705 will bolster system reliability by mitigating the contingency concerns and operating risks highlighted above, and by providing path and construction diversity to improve system operation for normal and contingency operating conditions that meet the Company's design standards. The Line 705 underground project offers the best solution as the new line provides an independent, diverse source to feed the southern Rockland - northern Bergen County area.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This Project does not have a direct impact on greenhouse gas emissions.

This Project is in alignment with the Company's goals to meet design standard and upgrade aging infrastructure. In addition, this Project addresses Corporate risks for Loss of Transmission and Substation facilities.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

Additional 138kV Line on Existing Line 702 Corridor: This overhead alternative would require the rebuilding of approximately five (5) miles of existing single 138kV Line 702 to two (2) 138kV lines between the Burns and West Nyack Substations. In order to keep existing Line 702 in service, a temporary Transmission Line 702 would be required during construction along with the relocation of Line 562 from structure 51 (in the general vicinity of the Snake Hill Road Substation) to the West Nyack Substation. The existing Line 702 ROW contains floodplains, wetlands, streams, and threatened and

endangered species habitat. Although the overhead alternative would allow for the use of the existing ROW, it is not considered a viable option because a 50-foot wide portion of the existing ROW would have to be cleared in order to accommodate the temporary line. This is the portion of the corridor is currently occupied by former Lines 63 and 64 between the Burns Substation and Lake DeForest in West Nyack. Although there would be no required expansion of the existing ROW for this overhead alternative, extensive clearing would be required because the vegetation along the de-energized portions of the Lines 63 and 64 has returned to its natural state since these lines were removed from service approximately 20 years ago. This existing overhead corridor alternative would have a negative impact on endangered species, have a limited timeframe for construction adjacent to a bald eagle habitat, would be significantly disruptive to the public, and although the Company has an easement, the work would require owner agreement and extensive clearing. For these reasons O&R does not consider this alternative a viable option.

Alternative 2 description and reason for rejection

Conversion of Lines 55 and 551 to 138 kV: The conversion of 69 kV Lines 55 (Lovett to Cedar Switch) and 551 (Cedar Switch to West Nyack) to 138 kV would provide a parallel 138kV feed to the Southern Rockland area. This alternative would be logistically challenging due to difficulty in accessing the work site which would be within an active railway corridor, and temporary lines would be needed during construction. Given the close proximity of the railway, adjacent NYS Route 9W and the densely developed areas surrounding this corridor the construction of temporary facilities would not be possible. In addition, this alternative would require the conversion of the Cedar Switch and Grassy Point stations in Stony Point to 138 kV. If the construction of temporary lines were possible, the Company estimates that the cost of this alternate project would be $136 million. Also, any underground options to run a new 138 kV line between the Lovett and West Nyack Substations would far exceed the costs and impacts of the proposed Line 705 solution. For these reasons, the Company does not consider this alternative a viable option.

Alternative 3 description and reason for rejection

Non-wires alternative ("NWA"): In December 2017, O&R examined NWA technologies as a potential solution to meet the energy demands of the Project area. O&R secured an independent assessment to review the suitability of deferring the traditional upgrade by alternative methods, such as demand response and energy efficiency, along with the determination for the availability of distributed energy resources ("DER"), or a combined portfolio thereof. The report concluded that the underground Line 705 Project fails O&R's overall NWA suitability criteria assessment.

Risk of No Action

Risk 1

No action will result in thermal violations of Line 652 during contingencies, leading to load shedding of approximately 8,000 customers to prevent damage to the Line 652 conductors. This situation will only worsen with the anticipated addition of large data center loads in the Orangeburg area resulting in additional thermal violations on Lines 654 and 656.

Risk 2

Over time, the "No Action" alternative would result in further degradation in the reliability of electrical service which is unacceptable based on O&R's design standards and risk assessment methodology.

Risk 3

Non-Financial Benefits This Project will provide additional electric power capacity to the transmission system and customers in the southern Rockland County and northern Bergen County areas. In addition, this Project will improve source reliability to the substations in these areas.
Summary of Financial Benefits and Costs (attach backup) 1. Cost-benefit analysis (if required) See Selective Undergrounding Resilience Program for more information. 2. Major financial benefits See Selective Undergrounding Resilience Program for more information. 3. Basis for estimate Historic similar projects.
Project Risks and Mitigation Plan Risk 1: Length of permitting process could delay overall project schedule. Mitigation plan: Timely submissions and responses in regard to permit applications and questions/comments/concerns submitted by permitting entities. Risk 2 Mitigation plan
Technical Evaluation / Analysis See Selective Undergrounding Resilience Program for more information.
Project Relationships (if applicable) N/A

3. Funding Detail ($000)

Historic Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Test Year (O&M Only)	Forecast 2023
O&M						
Regulatory Asset						
Capital	$1,482.9	$721.8	$565.9	$521.6		$808.1

2024-2028 Request:

Total Request by Year:

	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028
O&M					
Regulatory Asset					
Capital (Total)	$5,114.9	$26,161.9	$27,277.7		
Labor	$216.3	$1,464.4	$1,915.5		
M&S	$477.8	$1,905.7	$2,860.1		
Contract Svcs.	$3,743.3	$17,665.6	$17,031.6		
Other	$5.7	$278.4	$463.8		
Overheads	$1,021.1	$4,847.8	$5,006.7		

Micronet Weather Station Expansion Program

Emergency Preparedness

1. Project / Program Summary

Type: ☐ Project ☒ Program	**Category: ☒ Capital ☒ O&M**
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Micronet Weather Station Expansion Program	
Project/Program Manager: Matthew Leszak	**Project/Program Number (Level 1):**
Status: ☐ Initiation/Planning ☐ In-Progress (Projects Only) ☒ On-going (Programs Only)	
Estimated Start Date: Q1 2025	**Estimated Date In Service: Q4 2025**
2025-2029 Funding Request ($000) **Capital: $380** **O&M: $410**	

Work Description:

Orange and Rockland Utilities, Inc. (O&R or the Company) proposes to install seven weather stations in the O&R service territory. These weather stations will help fill weather observation and existing data gaps while providing crucial information on weather and climate. The seven proposed weather stations will be sited on Company property in the following locations:

-Port Jervis, NY;
-Middletown, NY;
-Monroe, NY;
-Pomona, NY;
-Spring Valley, NY;
-West Nyack, NY; and
-Blooming Grove, NY.

These weather stations, with their associated instrumentation, will be completed and operational within the Rate Year (*i.e.*, 2025). Total cost of the build-out for these seven weather stations is $380,000.00. The proposed weather stations will complement the existing network of weather stations owned by O&R's affiliate Consolidated Edison Company of New York, Inc. (CECONY), which yielded the NYC Micronet (17 CECONY--owned weather stations in New York City). Associated upkeep, calibration, and troubleshooting of equipment at these seven weather stations will be carried out by the Research Foundation for SUNY (the same entity which currently operates and maintains the NYC Micronet).

Maintenance schedule ranges from every few months to five years and will be handled by skilled technicians from the University of Albany (NYS Mesonet). Please refer to the table below for the projected maintenance schedule:

Task	Frequency
Site cleaning and inspection	Two to three times per year
Temperature sensor rotations for calibration	Every 2 years
Relative humidity sensor rotations for calibration	Every 18 months
Pressure sensor rotation for calibration	Every 5 years

Pyranometer sensor rotation for calibration	Every 2 years
Snow depth: Replacement of transducers	Every 2 years
Wind monitor: Replacement of vertical flange	Every 5 years
Wind monitor: Replacement of horizontal flange	Every 5+ years
Test wind monitor speed and direction	Every 3 years
Precipitation gauge: Filling with antifreeze	Every fall
Precipitation gauge: Empty antifreeze/water mix	Every spring
Test precipitation weight	Every 3 years

Justification Summary:

The seven proposed weather stations will be used to better understand the effects of climate change. As mentioned in NYS Senate Bill 4824-A, lines 11-18, a rise in storm intensity is expected resultant of climate change. This has been seen firsthand with the recent impactful storms of Winter Storms Riley and Quinn, Tropical Storm Isaias, the July 9th 2023 Hudson Valley floods, and the September 29th 2023 NYC floods. The weather data received from the proposed weather stations, in conjunction with incorporation into the Company impact model, will serve to reduce restoration and outage costs by providing a more granular sense of overhead distribution impacts. These additional weather stations are necessary as existing weather observations are sparse across the Lower Hudson Valley region, especially given the fact weather patterns change significantly on a localized scale due to terrain influences.

Climate change resilience planning requires a thorough understanding of current and past weather conditions. The weather data received from the proposed weather stations will contribute to reducing restoration and outage costs by providing a more specific understanding of impact, with particular emphasis on wind and ice events. These additional weather stations are necessary given how weather patterns change significantly on a localized scale due to terrain influences. The weather station data will also inform O&R's understanding of the changing likelihood of coincident and successive extreme events.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

This project will not impact greenhouse gas emissions directly. This project does offer some benefit to employee safety, as all proposed sites are located on Company property. Real-time weather observations may enable employees to understand when hazardous weather or ground conditions could be present at their place of work.

This project will directly complement the NYC Micronet, a network of 17 CECONY-owned weather stations.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
Existing, less reputable weather stations do exist in the proposed expansion area. Purchasing the weather data from these third-party owners is an alternative, but data integrity would be highly questionable. Accurate and reliable data is required not only for our impact model, but also to measure accurately the degree of climate change.

Risk of No Action

Risk 1
If no action is taken to pursue this project, the Company will have a less granular sense of potential weather impacts across the O&R service territory. This means O&R will continue to use existing processes for its Company impact model and its respective projections, which include retrieving weather data from non-representative weather stations in NYC and southern Westchester that do not adequately correlate to observed or forecasted weather across the Lower Hudson Valley.

Non-Financial Benefits

This project will provide the benefits of improved relationships with external stakeholders, facilitating regulatory compliance, and improved data for future climate change adaption decisions.

This project also continues a strategic partnership with the State University of New York (SUNY) at Albany. The Company will be supporting a state university through this partnership, as well as contributing to the NYS Mesonet by integrating the new weather monitoring stations under this project into the state-wide network that currently lacks a strong presence in the O&R service territory. In return, the Company will benefit from their already-established expertise in this field and vast array of resources in future research and analytics to properly digest the data that will be gathered.

Summary of Financial Benefits and Costs (attach backup)

1. Total cost is $ 788,000.00

2. Major financial benefits

This additional weather stations will provide more localized and accurate weather data, allowing for O&R to request mutual aid more efficiently, thereby providing cost savings.

3. Basis for estimate

SUNY at Albany provided an itemized operating and maintenance schedule to O&R detailing the costs for the next 5 years.

Project Risks and Mitigation Plan

Risk 1	Mitigation plan
Project risks include potential supply chain issues impacting the retrieval of unique equipment and weather sensors. This may lead to delays with installation and ultimately the time when weather stations go online and become fully operational.	The mitigation plan is to order parts immediately upon acceptance of this project and/or seek out other companies who may be able to fulfill in a timelier manner.

Technical Evaluation / Analysis

N/A

Project Relationships (if applicable)

This project will directly complement the NYC Micronet, a network of 17 CECONY--owned weather stations.

3. Funding Detail ($000)

2019-2024 Actual/Forecast Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Forecast 2023	Forecast 2024
O&M	-	-	-	-	-	-
Capital	-	-	-	-	-	-

2025-2029 Request:

Total Request by Year:

	Request 2025	Request 2026	Request 2027	Request 2028	Request 2029
O&M	**$0**	**$97**	**$99**	**$103**	**$106**
Capital (Total)	**$380**	**$0**	**$0**	**$0**	**$0**
Labor	$0	$0	$0	$0	$0
M&S	$0	$0	$0	$0	$0
Contract Svcs.	$380	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Overheads	$0	$0	$0	$0	$0

Long Range Funding Projections

	2030-2034	2035-2039	2040-2044
O&M	**$570**	**$630**	**$700**
Capital	**$0**	**$0**	**$0**
Basis for funding direction:	Annual inflation-related increases estimated (2.2%)	Annual inflation-related increases estimated (2.2%)	Annual inflation-related increases estimated (2.2%)

Explanation of Long Range Funding Projections:

The Company developed cost estimates for this program through 2029. For years 2030-2044, estimated cost accounts for future on-going maintenance and was escalated by 2.2% for inflation.

NY Accelerated Smart Grid Distribution Automation Program

Distribution Engineering

1. Project / Program Summary

Type: ☐ Project ☒ Program	**Category: ☒ Capital ☐ O&M**
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: NY Accelerated Smart Grid Distribution Automation Program	
Project/Program Manager: Ben Brown	**Project/Program Number (Level 1): 10075237**
Status: ☐ Initiation/Planning ☐ In-Progress (Projects Only) ☒ On-going (Programs Only)	
Estimated Start Date: Q1 2025	**Estimated Date In Service: Q4 2029**
2025-2029 Funding Request ($000) **Capital: $60,620** **O&M: $0**	

Work Description:

This project supports Orange and Rockland Utilities, Inc.'s (O&R or the Company) goal of a fully smart-grid ready distribution system with centralized control. Paired with the installation of an Advanced Distribution Management System (ADMS), the goal of this program is to be able to identify service interruptions automatically and sectionalize customers into segments of 250 customers or less. O&R can realize this goal by replacing manually operated switching devices with remotely operable switching devices and integrating them into the ADMS. This project includes the installation and commissioning of Supervisory Control and Data Acquisition (SCADA) controlled devices (reclosers, smart capacitors, remotely operated switches, power quality sensors, and smart fuses) on a feeder-by-feeder basis. Additionally, the data gathered from the SCADA controlled devices provides better visibility of momentary outages in terms of frequency and location. The Company can analyze this data to direct tree trimming crews to areas where branches may already be encroaching on lines and thereby result in a more expeditious restoration of service to customers.

O&R has made steady progress toward centralized automation control, and as of 11/15/23, 90 percent of the total circuits in the O&R service territory have distribution automation (DA) devices installed. Approximately 55 percent of those circuits are in auto-loop configurations, thereby enhancing reliability. This equates to about 55 percent of the total circuits being fully smart-grid-ready (*i.e.*, installation of Motor Operated Air-Breaks (MOABS), mid-point reclosers, and auto-loops).

The NY Smart Grid Resiliency Project is focused on installing and upgrading field devices with command-and-control schemes which will result in improved storm resiliency and system reliability. The design philosophy is a three-tiered approach: feeder optimization, field automation and centralized automation control. This project focuses on the field automation portion of the design philosophy.

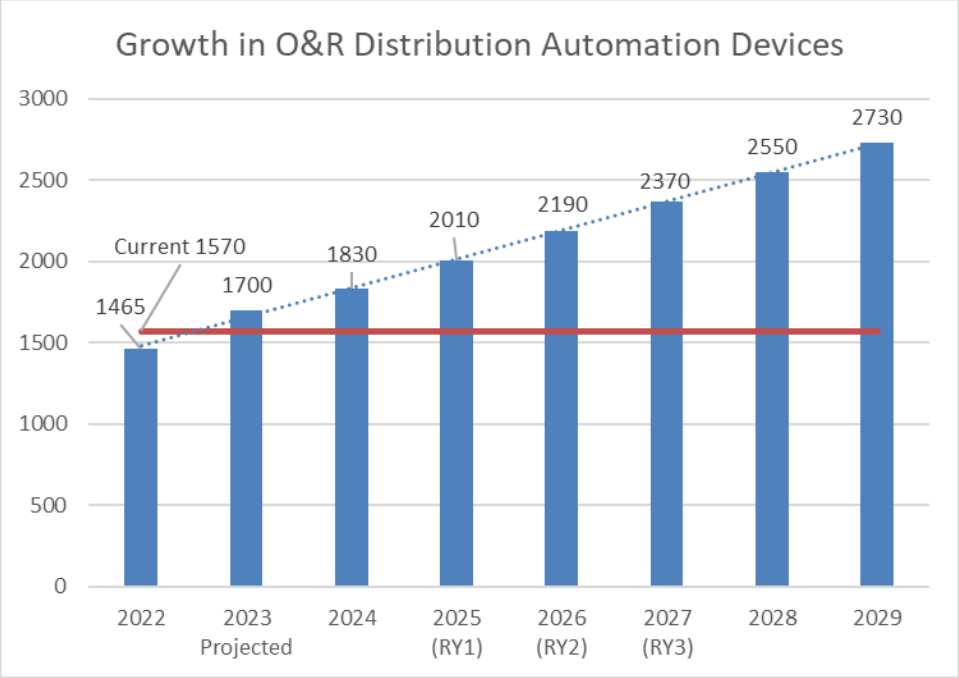
- Feeder Optimization
    - Design an efficient system through the use of smart capacitors, phase balancing and power quality monitoring (sensors);
    - Smart capacitors allow Volt/Var Optimization (VVO); and

- Advanced sensors give visibility into feeder behavior.

- Field Automation
  - Automatic fault isolation via recloser auto loop design;
  - Reduced customer outages and faster restore times with auto loop restoration schemes; and
  - Strategic placement of MOABs to provide 250 customer segmentation;
    - Reduced truck rolls; and
    - Faster restoration times.

- Centralized Automation Control
  - Monitoring and Control from the Distribution Control Center (DCC);
  - Segmentation and customer restoration via SCADA controlled devices; and
  - The SCADA controlled devices provide monitoring, control and automation through the ADMS with Fault Location, Isolation and Service Restoration (FLISR) utilizing the reclosers and smart fuses to enable automatic system healing of the distribution circuits.

O&R initially planned to install the remaining distribution automation components over an eight-year timeframe. However, due to the new climate change science, O&R is proposing to accelerate these installations to a five-year deployment (2025 – 2029) to achieve improved resiliency for all customers. O&R plans to engage one to two additional contractor crews to complete installations. The revised budget to support this accelerated deployment will cover material, labor and engineering costs and will support approximately 180 devices per year. Each unit costs, on average, between $60k and $65k. The chart below shows O&R's progress toward complete DA device deployment. Currently, the Company's electric distribution system is outfitted with approximately 500 reclosers, 1010 MOABs, 126 smart capacitors, and over 157 circuits in auto loop configuration.



The design philosophy follows the three-tiered approach to automating the distribution system outlined in the Justification Summary section below.

Justification Summary:

The NY Smart Grid Resiliency Project and the associated devices provide operators with real-time system information, reducing the time to address issues on the electric distribution system. Operators can recognize and respond to system issues and begin to mitigate problems well before customers or emergency workers can report them. This improves the safety of addressing dangerous situations, such as downed electric wires, reduces the number of customers affected by outages, and reduces the time it takes for restoration workers to arrive at the right location, repair damage, and restore the system.

For example, O&R analyzed the effect of the Company's smart grid initiatives on three historic extreme weather events, *i.e.*, Tropical Storm (TS) Isaias, TS Ida, and the Christmas 2020 storm, as quantified below. During these three storms, the Company's operators were able to execute switching and safety related steps remotely. This allowed customers to be restored faster, because the operator could isolate faulted areas without a crew onsite and put switching devices in and out of safety configurations without dispatching a truck to the location. A saved truck roll alone can cut between a few minutes to many hours off the restoration time of an outage. The auto-loops and mid-point reclosers that O&R installed operated automatically to save thousands of customers from experiencing an outage. The reclosers, MOABs, and advanced sensors provided real-time system information, reducing the time to recognize and address issues on the system, which improved storm resiliency. As the Company continues to automate its electric distribution system, it will continue to experience savings in outage restoration times, avoided outages, and reduced truck rolls to switching locations.

Distribution Automation Benefits	TS Isaias	TS Ida	Christmas 2020
How many customer outages were avoided by Distribution Automation?	66 Auto-Loops and 21 Reclosers operated, preventing outages to: 64,000 customers	8 Auto-Loops and 2 reclosers operated, preventing outages to: 8,370 customers	32 Auto-loops and 9 reclosers operated, preventing outages to: 36,400 customers
How many customer outages were shortened by remote switching?	237 switch steps were executed, shortening 73,150 customer outages	20 switch steps were executed, shortening 3,475 customer outages	152 switch steps were executed, shortening 32,300 customer outages
Safety related switching steps	265	16	65
How many truck rolls were avoided?	502	36	217

By continuing the Distribution Automation Smart Grid Expansion Projects to develop a fully smart-grid-ready system, the entire O&R service territory will realize the benefits described above. Additionally, the data gathered from the SCADA controlled devices provides better visibility of momentary outages in terms of frequency and location. This data can be analyzed to direct tree trimming crews to areas where branches may already be encroaching on lines. This will allow the Company to achieve an even greater number of avoided and shortened customer outages, safety related switching steps, and avoided truck rolls during extreme weather events.

As documented in the O&R's Climate Change Vulnerability Study (CCVS) (filed September 2023, in NYPSC Case 22-E-0222), O&R anticipates that many of these events will increase in frequency and/or severity as a result of climate change, including:

- Hurricanes and tropical cyclones;
- Snow and ice;
- Lightning and tornadoes; and
- Multiple extreme weather events (occurring coincidently or sequentially).

High wind events can lead to structure failure and wind damage to overhead line towers, structures, and downed lines from trees and other debris, leading to outages. Projections show that maximum wind gusts could reach 110 mph in the future. Furthermore, projections in the CCVS show that the frequency of strong storms will likely increase in the future, with higher rainfall amounts, stronger winds, and coastal storm surge. More specifically, North Atlantic hurricanes are projected to become more intense (~5% increase) and have higher rainfall amounts (~10%-15% increase) in the future relative to historical hurricanes. There is also the potential for higher intensity radial icing events in the winter months in the future, though the magnitude is uncertain.

Projections show that extreme events including hurricanes, snow and ice, cold snaps, lightning and tornadoes, drought, and wildfire could increase in intensity in the O&R service territory in the future. There is also high confidence that the probability of coincident extreme events will likely continue to increase in both frequency and intensity in the future. This increase in extreme weather events will cause more frequent contacts between distribution lines and vegetation or debris. Without the installation of distribution automation devices, those contacts can cause thousands of outages that, particularly during large events that stretch response crews thin, can take days to repair. This is supported by analysis done on the performance of distribution automation devices during storm activity, which showed that thousands of customer outages were avoided and outage times were significantly reduced due to these devices and the control systems used to remotely control them.

The ongoing expansion of this project will continue to storm harden the distribution system, which is critical as the O&R service territory is projected to experience more extreme events and climate hazards as temperatures increase. Without the implementation of distribution automation through this project, the system is at risk of more outages and longer restoration times.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

The first tier of the Smart Grid philosophy (feeder optimization) supports the reduction of greenhouse gasses by optimizing the feeders such that the hosting capacity is monitored through the SCADA controlled device sensors and issues like voltage fluctuations are managed with solutions like VVO. The sensor data provides a more robust data set for hosting capacity analysis and will allow more distributed energy resources (DER) to be deployed resulting in a reduction of greenhouse gasses. Additionally, the improved reliability associated with FLISR will allow DERs to stay online more often rather than being offline when an entire circuit is in an outage state.

This project benefits every customer in the O&R service territory, including those located in disadvantaged communities (DACs).

The Smart Grid project is an integral part of the Company's goal to improve system resiliency and storm harden the distribution system. The incremental expansion of this project will reduce the time to full distribution system automation by 3 years. By installing an extra 60 devices a year, the Company will reduce the number of customers affected by storms brought on by climate change.

The NY Accelerated Smart Grid Distribution Automation Program supports Initiative 2 under Pillar 1 of the Clean Energy Commitment, Build the Grid of the Future.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection
The alternative to accelerating the Smart Grid deployment is to continue with the planned deployment rate and not realize a faster mitigation of climate change impacts on the distribution system. This will negatively impact the Company's system resiliency, storm hardening and customer experience efforts.

Risk of No Action

Risk 1
Analysis done on the performance of the DA devices during storm activity has shown that tens of thousands of customers were saved from ever seeing a storm related outage and tens of thousands of customers experienced a significantly reduced outage time due to these devices and the control systems used to control them remotely. The accelerated deployment for this project will expedite the storm hardening of the distribution system and will continue to provide an enhanced customer experience. The risk of no action will maintain the 8-year projection of full automation deployment and the realization of a faster mitigation to climate change impacts on the distribution system will be delayed.

Non-Financial Benefits

The Smart Grid program has proven to have the following non-financial benefits:

- Increased safety. The Control room can mitigate dangerous situations caused by downed wires without sending a line crew to the location.
- Improved resiliency and reliability. Auto loop operations reduce the number of customers affected by system activity and remotely operated switches reduce outage times.
- Increased customer satisfaction. By avoiding customer outages, reducing outage duration and improving public safety, the Company is providing an enhanced customer experience.

Summary of Financial Benefits and Costs

1. Cost analysis

2. Major financial benefits

The benefits of this program are as described in the Work Justification and Non-Financial Benefits sections above.

3. Basis for estimate

There are approximately 1000 units left to be installed in the O&R service territory. At the current rate of spending, the timeframe to install all devices will be eight years (~120 device units/yr.). By augmenting the budget for five years after the current rate period, the installation timeframe will be reduced to five years.

Year	2024	2025 (RY1)	2026 (RY2)	2027 (RY3)	2028	2029
Units/Yr	120	180	180	180	180	180
Installation	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000
Commissioning	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000
MISC	$ 1,600	$ 1,600	$ 1,600	$ 1,600	$ 1,600	$ 1,600
Total/Yr	$ 7,992,000	$ 11,988,000	$ 11,988,000	$ 11,988,000	$ 11,988,000	$ 11,988,000

The current spending rate is about $8M/yr. This includes the NY Smart Grid (NY SG) Resiliency and MOAB Upgrade budgets. With the MOAB Upgrade budget expiring* at the end of the current rate year, the NY SG Resiliency budget will need to be augmented by $1.2M to allow the same rate of installations to continue. The budget will need to be further augmented by $4M to accommodate the accelerated installation rate.

* The MOAB Upgrade project focused on replacing a select number of manually operated devices that had a high rate of operation, as well as ones that were on the outreaches of the O&R service territory. With these devices now upgraded, the funds can be repurposed to augment the NY SG budget.

Project Risks and Mitigation Plan

Risk 1	Mitigation plan
Material Procurement.	Pre-ordering allows the vendor to procure parts and build the devices well before they are needed.

Risk 2	Mitigation plan
Storm/rain delays. This could lead to budget underruns and the yearly plan not being completed.	Review previous year's performance and account for an average number of storm/rain days. Manage the plan on a monthly basis to mitigate any delays.

Technical Evaluation / Analysis

O&R completed an analysis of the performance of the DA project after three major historic storms. The goal was to see how the program impacted the number of customers affected and restoration times associated with these storm events. The result of the analysis found that tens of thousands of customers were saved from experiencing a storm related outage and tens of thousands of customers experienced a significantly reduced outage time due to these devices and the control systems used to control them remotely. The results of this study are discussed in the Justification section above.

DA Performance during Tropical Storm Isaias (8/2020)

- The DCC remotely executed 426 switching steps and 264 safety related (Hot Line Tag) steps.
    - This equated to 690 truck rolls saved and approximately 74,000 customers seeing reduced outage times.
- The auto-loops and mid-point reclosers operated automatically to save approximately 64,000 customers from ever seeing an outage.
    - 20% of O&R's customer base did not see an outage during the storm.

Project Relationships (if applicable)

Not applicable.

3. Funding Detail ($000)

2019-2024 Actual/Forecast Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Forecast 2023	Forecast 2024
O&M	-	-	-	-	-	-
Capital	**$5,500**	**$7,400**	**$8,100**	**$7,700**	**$8,350**	**$8,000**

2025-2029 Request:

Total Request by Year:

	Request 2025	Request 2026	Request 2027	Request 2028	Request 2029
O&M	-	-	-	-	-
Capital (Total)	**$12,000**	**$12,060**	**$12,122**	**$12,185**	**$12,251**
Labor	$2,266	$2,277	$2,289	$2,301	$2,313
M&S	$7,948	$7,988	$8,029	$8,071	$8,114
Contract Svcs.	$1,573	$1,581	$1,589	$1,597	$1,606
Other	$213	$214	$215	$216	$218
Overheads	$0	$0	$0	$0	$0

Long Range Funding Projections

	2030-2034	2035-2039	2040-2044
O&M	**$0**	**$0**	**$0**
Capital	**$13,450**	**$11,650**	**$12,990**
Basis for funding direction:	Annual inflation-related increases estimated (2.2%)	Annual inflation-related increases estimated (2.2%)	Annual inflation-related increases estimated (2.2%)

Explanation of Long Range Funding Projections:

The Company developed cost estimates for this program through 2029. After 2029, the Company envisions device replacements, as well as adoption to new technologies. Additionally, the Company will need to update its SCADA system software as smart grid technologies evolve in the future. For years 2030-2044, the Company escalated the estimated cost by 2.2% each year to account for inflation.

Emergency Response Control Facility

Emergency Preparedness

1. Project / Program Summary

Type: ☒ Project ☐ Program	**Category: ☒ Capital ☒ O&M**
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Emergency Response Control Facility	
Project/Program Manager: Denis Smalley, Ted Sikora	**Project/Program Number (Level 1):**
Status: ☒ Initiation/Planning ☐ In-Progress (Projects Only) ☐ On-going (Programs Only)	
Estimated Start Date: Q1 2025	**Estimated Date In Service: Q4 2027**
2025-2029 Funding Request ($000) **Capital: $14,550** **O&M: $1,080**	

Work Description:

This project will install a dedicated emergency response control facility on existing land owned by O&R across from the Blooming Grove Operating Center. This location is centrally located within the O&R service territory and has easy highway access for emergency response events, which are projected to increase in frequency and severity based on the latest climate projections. The facility will have an incident control center to monitor O&R's overall electric system during emergencies, as well as dedicated spaces for planners and dispatchment of storm response personnel.

The Emergency Response Control Facility will provide adequate space for personnel to mobilize, especially higher storm classifications requiring significantly more in-person personnel response. This facility would increase the presence of the following critical roles within O&R's Incident Command Structure.

- Present Storms Ops Command Post Roles:
  - Incident Commander
  - Emergency Management Officer
  - Operations Section Chief
  - Planning Section Chief
- Additional Roles present with new facility:
  - Liaison Officer
  - Customer Operations Officer
  - EH&S Officer
  - Admin/Finance Section Chief
  - Logistics Section Chief
  - Information Officer
  - Storm Officer
  - Additional Unit Leaders/Branch Directors as required for calls/meetings

The Emergency Response Control Facility will also include a large conference room, designed to replace the Old Conference Room that is currently utilized in the Blooming Grove Operating Center, and include the following features:

- full telecom and video conferencing capabilities.

- wall with multiple large screens for displaying outage information, weather updates/radar, conference calls, etc.

The Emergency Response Control Facility will also include new System Emergency Response Team (SERT) Operations Center would replace the current setup in the Blooming Grove auditorium. This Center would provide location for the following teams (per 12-hour shift):

- 6-15 SERT team members (Operations personnel, dispatch, analysts)
- 2-4 Estimated Time of Restoration (ETR) team members (analysts, work package creation, coordination meetings, work in conjunction with SERT team)
- 2-8 Restoration Analysis team members (Outage Management System (OMS)/Advanced Metering Infrastructure (AMI) analysis, which are currently setup between the Blooming Grove conference room and Spring Valley)
- 7-15 Priority Response Group (PRG) (handling, critical facilities, road opening, cut and clear work, which are currently setup between the offices in the New Business areas in Blooming Grove and Spring Valley).

The project scope will include 3 acres of site work, including grading, drainage, fencing, lighting, pavement, and parking, at a cost of $2.0 million, as well as the construction of a 25,000 sq ft, 2 story office building at a cost of $8.75 million (assuming $350/sq ft), for a total cost of $10.75 million. The project would be completed over a three-year period over 2025-27, with the first year (2025) planned for engineering, design, zoning and planning board approvals. Land development and construction would occur over the next two years (2026-27).

Once the facility is placed in service, the facility will require ongoing maintenance, including 2 FTEs, at a cost of $500K per year starting in 2028.

This resiliency project is proposed as a storm hardening measure in the Climate Change Resilience Plan filing, as required by Public Service Law (PSL) § 66(29) – PSC Case 22-E-0222.

Justification Summary:

Having a dedicated facility that will be permanently configured as an emergency response control facility will save time for mobilizing in preparation for storm coordination and response. With current emergency storm response activations, conference rooms and offices are temporarily reconfigured at the existing Blooming Grove Operating Center to prepare for activating storm response.

Below is a summary of enhancements that the proposed emergency response control facility will provide over the current configuration for storm activations at the existing Blooming Grove Operations Center:

- Reduce time for mobilization for storm activations by having a permanent dedicated facility being centrally located to the service territory with easy access to US Highway 6, which connects to I-84 and I-87, and multiple nearby hotels, the new facility would be prime location for onboarding various mutual assistance resources (damage assessment, site safety, service restoration, line, tree, etc.).
- One of the prime locations in Rockland County, the Sheraton in Mahwah, where O&R conducts onboarding is closing, therefore having an additional onboarding location would be beneficial.
- In addition to providing space to accommodate the various operational teams, the new Control Ops Facility would remain setup in preparation for storm/emergency activity (desktops, docking stations, phones, etc.) saving on average of 16 FTE-hours of setup time and 16 FTE-hours of breakdown time per event.

- The new facility would also have dedicated space for offices and cubicles for various departments (e.g., centralized location for Emergency Preparedness personnel).

Below is a historical number of annual activations for storm response. Within the period shown in the table below, the Company experienced 106 storm activations with 35 activations greater than $1,000,000 in storm response costs in O&R's New York service territory, which includes the 2020 Christmas nor'easter and Tropical Storms Henry, Ida, Isaias. The O&R service territory has seen an increase in the frequency and severity of storms, with 70% of total storm activations over the past eight years having occurred since 2020.

Year	No. of Storm Activations	Percentage of Total	No. of Storm Activations > $1,000,000	Percentage of Total
2016	8	7.5%	-	0%
2017	8	7.5%	3	8.6%
2018	9	8.6%	4	11.4%
2019	7	6.6%	6	17.1%
2020	12	11.3%	6	17.1%
2021	25	23.6%	8	22.9%
2022	19	17.9%	4	11.4%
2023 to date (as of 10/31/23)	18	17.0%	4	11.4%
Total	106	100%	35	100%

As extreme weather events are projected to increase in the O&R service territory, it will be essential to have a dedicated emergency response control facility, especially in the event of a catastrophic storm or multiple storm events occurring closely in duration to one another. Below is a summary of anticipated changes to the future frequency and intensity of several types of extreme weather events based on qualitative literature review in the O&R Climate Change Vulnerability Study.

Extreme Event	Future Frequency	Future Intensity
Hurricanes and tropical cyclones	Unchanged	Increase
Snow and ice (i.e., nor'easters)	Decrease	Increase
Cold snaps and polar vortex events	Decrease	Potentially Increase
Lightning and tornadoes	Potentially Increase	Potentially Increase
Drought	Increase	Increase
Wildfire	Increase	Increase
Multiple extreme weather events	Increase	Increase

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

Impact on Disadvantaged Communities

This project has been identified as a measure to mitigate climate-related risks across the O&R system based on potential system vulnerabilities, agnostic to customer demographics. This program will benefit all customers served by facilities included in-scope, including customers in Disadvantaged Communities (DACs).

Impact on Greenhouse Gas (GHG) Emissions

The Emergency Response Control Facility will have no direct impact on GHG Emissions.

Impact on Clean Energy Commitment

The Emergency Response Control Facility project supports Initiative 2 under Pillar 1 of the Clean Energy Commitment, Build the Grid of the Future.

2. Supplemental Information

Alternatives

Alternative description and reason for rejection

Lease space in an existing facility not owned by O&R rather than constructing a new facility. However, this would result in ongoing leasing costs and overall operational costs. A leased facility may not be as centrally located or as easily accessible to a highway which could transport storm response resources more quickly to impacted areas throughout O&R's service territory. A leased spaced would also not be as customized or configured as would be with a constructed facility specifically for the purpose of emergency storm response.

Risk of No Action

Risk

If this project is not implemented, O&R would continue to utilize the existing Blooming Grove Operating Center and other facilities, which will require setup and breakdown for each storm event. However, this will require more time to mobilize personnel and resources for storm response events. As extreme weather events increase in both frequency and intensity, operating emergency response out of temporarily configured facilities will result in higher operational costs as well as result in longer customer outage durations.

Non-Financial Benefits

Having a dedicated space that will be permanently configured as an emergency response control facility will save time while mobilizing in preparation for storm coordination and response. With current emergency storm response activations, conference rooms and offices are temporarily reconfigured at the existing Blooming Grove Operating Center to prepare for activating storm response. The new facility will provide necessary office space for emergency planners and personnel in a location adjacent to where storm equipment is stored. This arrangement is expected to improve overall workflow and communication within and between departments.

Summary of Financial Benefits and Costs

1. Cost:

The facility will cost $14,550,000 with an estimated $500K in annual maintenance cost.

2. Benefits:

The benefits of this program are as described in the Non-Financial Benefits section above.

3. Basis for estimate

The basis for the cost estimate is provided in the Work Description.

Project Risks and Mitigation Plan

Risk 1	Mitigation plan
Length of permitting process could delay the overall project schedule.	Timely submissions and responses in regard to permit applications and questions/comments/concerns submitted by permitting entities.

Risk 2	Mitigation plan
Wetland survey shows only a small portion of the land can be developed.	Redesign to reconfigure the building with alternative floor plans (i.e. multi-story building vs. single story, etc.)

Technical Evaluation / Analysis

Please refer to the climate change data and analysis in the justification summary above.

Project Relationships (if applicable)

Project relationships are not applicable.

3. Funding Detail ($000)

2019-2024 Actual/Forecast Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Forecast 2023	Forecast 2024
O&M	-	-	-	-	-	-
Capital	-	-	-	-	-	-

2025-2029 Request:

Total Request by Year:

	Request 2025	Request 2026	Request 2027	Request 2028	Request 2029

O&M	**$0**	**$0**	**$0**	**$534**	**$546**
Capital (Total)	**$2,096**	**$5,038**	**$7,413**	**$0**	**$0**
Labor	$0	$0	$0	$0	$0
M&S	$0	$0	$0	$0	$0
Contract Svcs.	$1,677	$4,030	$5,930	$0	$0
Other	$0	$0	$0	$0	$0
Overheads	$419	$1,008	$1,483	$0	$0

Long Range Funding Projections

	2030-2034	**2035-2039**	**2040-2044**
O&M	**$2,910**	**$3,250**	**$3,620**
Capital	**$2,670**	**$2,980**	**$3,320**
Basis for funding direction:	Annual inflation-related increases estimated (2.2%)	Annual inflation-related increases estimated (2.2%)	Annual inflation-related increases estimated (2.2%)

Explanation of Long Range Funding Projections:

The Company developed cost estimates for this program through 2029. For years 2030-2044, estimated cost accounts for the on-going maintenance of the facility and was escalated by 2.2% for inflation.

Storm Material Management Program

Electric Operations

1. Project / Program Summary

Type: ☒ Project ☐ Program	**Category: ☒ Capital ☒ O&M**
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Storm Material Management Program	
Project/Program Manager: Denis Smalley, Danielle Ellis (Paul Barth)	**Project/Program Number (Level 1):**
Status: ☒ Initiation/Planning ☐ In-Progress (Projects Only) ☐ On-going (Programs Only)	
Estimated Start Date: Q1 2025	**Estimated Date In Service: Q4 2027**
2025-2029 Funding Request ($000) **Capital: $35,220** **O&M: $2,370**	

Work Description:

This project will install a dedicated storm material warehousing facility on existing land owned by O&R across from the Blooming Grove Operating Center. This location is centrally located within the O&R service territory and has easy highway access for emergency storm response events, which are projected to increase in frequency and severity based on the latest climate projections.

The project will include 7 acres of site work, including grading, drainage, fencing, lighting, pavement, and parking, at a cost of $4.5 million, as well as the construction of a 55,000 sq ft, 1 story warehouse facility at a cost of $10.5 million (assuming $190/sq ft), for a total facility cost of $15 million. The project would be completed over a three-year period over 2025-27, with the first year (2025) planned for engineering, design, zoning and planning board approvals. Land development and construction would occur over the next two years (2026-27). Once the facility is placed in service, the facility will require ongoing maintenance, including 2 FTEs, at a cost of $500k per year starting in 2028.

The storm material warehousing facility will house critical spare equipment inventory for $5 million in materials for the transmission system and an additional $9 million in materials for the distribution system, for a total of $14 million in material inventory. This level of inventory would support 30 days of material for multiple catastrophic events, similar to Superstorm Sandy. This inventory will be purchase from 2027-29 once the warehouse is built. The exact timing of the inventory expenditure will depend on supply chain lead times and production slot times. Some of equipment has seen up to four years for longer-lead items based on current production estimates.

This resiliency project is proposed as a storm hardening measure in the Climate Change Resilience Plan filing, as required by Public Service Law (PSL) § 66(29) – PSC Case 22-E-0222.

Justification Summary:

Currently, O&R maintains approximately 5 days' worth of emergency material inventory, which is enough for a single catastrophic level storm. It is currently divided across three storm rooms in Spring Valley, Blooming Grove and Middletown, with each location providing only 1,000 sq ft of storage space that is also used for staging materials to be sent out for storm repair. O&R also stores storm

material in 7 (40' x 8.5') CONEX boxes which provide an additional ~2,400 sq ft of storage space. Additionally, O&R also maintains storm materials at offsite locations in Anixter supplier facility in Pittstown, PA (90 minutes from Port Jervis, NY, westernmost point of O&R service territory) and over 300 poles at a supplier facility in Williamsport, PA (2.5 hours from Port Jervis, NY, westernmost point of O&R service territory).

As extreme weather events are projected to increase in the O&R service territory, it will be essential to maintain critical spare inventory locally, especially in the event of a catastrophic storm or multiple storm events occurring closely in duration to one another. Below is a summary of anticipated changes to the future frequency and intensity of several types of extreme weather events based on qualitative literature review in the O&R Climate Change Vulnerability Study.

Extreme Event	Future Frequency	Future Intensity
Hurricanes and tropical cyclones	Unchanged	Increase
Snow and ice	Decrease	Increase
Cold snaps and polar vortex events	Decrease	Potentially Increase
Lightning and tornadoes	Potentially Increase	Potentially Increase
Drought	Increase	Increase
Wildfire	Increase	Increase
Multiple extreme weather events	Increase	Increase

Therefore, this storm material warehouse with 30 days' worth of storm inventory will greatly improve O&R's ability to recover quickly from catastrophic weather event(s) as well as providing mutual aid support to neighboring utilities through New York Utilities Material Sharing Group program. Additionally, this storm inventory will mitigate the current industry supply chain issues that are elongating lead times for critical components and delaying shipments of equipment.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

Impact on Disadvantaged Communities

The Company has identified this project as a measure to mitigate climate-related risks across the O&R system based on potential system vulnerabilities, agnostic to customer demographics. This project will benefit all customers served by facilities included in-scope, including customers in Disadvantaged Communities.

Impact on Greenhouse Gas (GHG) Emissions

The Storm Material Management project will have no direct impact on GHG Emissions.

Impact on Clean Energy Commitment

The Storm Material Management project supports Initiative 2 under Pillar 1 of the Clean Energy Commitment, Build the Grid of the Future.

2. Supplemental Information

Alternatives

Alternative description and reason for rejection
Additional shared equipment contracts with other utilities are one possible alternative. However, climate change will be affects all utilities within the region and therefore might not have spares to share.

Risk of No Action

Risk
O&R could continue to stock inventory as it currently does. However, that would ignore the increasing frequency and severity of storm events. If O&R does not have critical spare components on hand, it is necessary to either approach qualified vendors to see if they can expeditiously ship it or ask other utilities to see if they have the necessary equipment. Both alternatives would prolong the outage condition for customers if alternative work around solutions were not available.

Non-Financial Benefits

Maintaining a critical spare list and inventory will improve restoration times for customers by having the required equipment on hand to support restoration after for major storm events, thereby reducing outage durations and improving reliability.

Summary of Financial Benefits and Costs (attach backup)

1. Cost: The warehouse is estimated to cost is $19.5M with $500K in annual maintenance. The storm material is estimated to cost $5M for transmission and $9M for distribution, for a total of $14M.

2. Benefit: The benefits for this project are described in the Work Justification and Non-Financial Benefits sections.

3. Basis for estimate: The basis for the cost estimate is provided in the Work Description.

Project Risks and Mitigation Plan

Risk 1	Mitigation plan
Length of permitting process could delay the overall project schedule.	Timely submissions and responses in regard to permit applications and questions/comments/concerns submitted by permitting entities.

Risk 2	Mitigation plan
Wetland survey shows only a small portion of the land can be developed.	Redesign to reconfigure the building with alternative floor plans (i.e. multi-story building vs. single story, etc.)

Technical Evaluation / Analysis

Please refer to the climate change data and analysis in the justification summary above.
Project Relationships (if applicable) Project relationships are not applicable.

3. Funding Detail ($000)

2019-2024 Actual/Forecast Spend

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Forecast 2023	Forecast 2024
O&M	-	-	-	-	-	-
Capital	-	-	-	-	-	-

2025-2029 Request:

Total Request by Year:

	Request 2025	Request 2026	Request 2027	Request 2028	Request 2029
O&M	**$0**	**$114**	**$317**	**$960**	**$981**
Capital (Total)	**$2,250**	**$7,030**	**$11,829**	**$7,649**	**$6,303**
Labor	$0	$0	$0	$0	$0
M&S	$0	$0	$1,485	$7,649	$6,303
Contract Svcs.	$1,800	$5,624	$8,275	$0	$0
Other	$0	$0	$0	$0	$0
Overheads	$450	$1,406	$2,069	$0	$0

Long Range Funding Projections

	2030-2034	2035-2039	2040-2044
O&M	**$5,240**	**$5,840**	**$6,510**
Capital	**$2,670**	**$2,980**	**$3,320**
Basis for funding direction:	Annual inflation-related increases estimated (2.2%)	Annual inflation-related increases estimated (2.2%)	Annual inflation-related increases estimated (2.2%)

Explanation of Long Range Funding Projections: The Company developed cost estimates for this program through 2029. For years 2030-2044, estimated cost is for on-going maintenance for the storm material warehouse and was escalated by 2.2% for inflation.

Con Edison and O&R Storm Resilience Center

Electric Distribution

1. Project / Program Summary

Type: ☐ **Project** ☒ **Program**	**Category:** ☒ **Capital** ☐ **O&M**
Work Plan Category: ☐ **Regulatory Mandated** ☒ **Operationally Required** ☐ **Strategic**	
Project/Program Title: Con Edison and O&R Storm Resilience Center	
Project/Program Manager: George Czerniewski	**Project/Program Number (Level 1):** 27207949
Status: ☒ **Initiation/Planning** ☐ **In-Progress (Projects Only)** ☐ **On-going (Programs Only)**	
Estimated Start Date: 2025	**Estimated Date In-Service: 2030**
2025-2029 Funding Request ($000) **Capital: $12,610** **O&M: $370**	

Work Description:

Over the past decade, New York City and the surrounding area has experienced an increasing number of named storms (i.e., nor'easters, hurricanes, and tropical storms), tornadoes, severe/straight-line wind events, heavy rains/severe flash floods, heat waves, and other extreme weather events that have resulted in unprecedented challenges to Con Edison's and O&R's customers and the communities we serve. As a result of these challenges, the State of New York passed an amendment to the public service law, in relation to storm hardening and system resiliency plans (Part A of the Act). As stated in the Act, the Legislature declared, "that, due to the rise in storm intensity, and effects of climate change, dedicated storm hardening programs need to be developed and implemented throughout New York State to reduce damage and costs from future weather events, as well as facilitate prompt restoration times." The Act states further that, "It is in the state's interest for each utility to mitigate restoration costs and outage times to utility customers when developing transmission and distribution storm protection plans…."

As part of the effort to reduce outage duration times and costs for customers, Con Edison and O&R will significantly enhance our storm readiness and response programs through the development of a state-of-the-art storm response facility, the Con Edison and O&R Storm Resilience Center (the Center). The Storm Resilience Center will serve as a centralized staging area for crews, including mutual aid, during recovery from extreme weather events. It will also serve as a bed down location for mutual aid crews. Finally, the Center will serve as the year-round home for what will eventually be 250+ bucket trucks that the Companies maintain for fly-in mutual aid crews.

Con Edison and O&R plan to design and construct a facility that will include space to permanently keep and maintain storm vehicles for use by mutual aid crews, store storm materials and equipment, a Mutual Aid Storm Operations Management Center, indoor space for meetings and training, an outdoor training area, sleeper trailers to bed down and associated support space to house up to 500 mutual aid crew members. Since the focus of the Storm Resilience Center is to serve as a hub for the response to the most extreme weather impacts to the service territory, the facility itself will be hardened against those impacts as well. This will include backup power generation, flood protection, canopies for vehicles, fueling stations, and other features to allow the facility to be self-sustaining during an extreme weather event. Planning for the design and construction of the Storm Resilience

Center is in the initial stages as the Company is currently working to determine a site for purchase or repurposing.

The Company currently leases a site in Pomona, NY to store its mutual aid bucket trucks and stage for major weather events. The lease for the Pomona site ends in 2026, with plans to extend through 2027. However, it is not clear if the Company will be able to continue the lease beyond that. Further, the Pomona site is not big enough to accommodate 250+ mutual aid bucket trucks that the Con Edison and O&R will have by that time. In addition, this site cannot accommodate material storing, staging and on-stie lodging of mutual aid. Furthermore, most Con Edison sites (e.g., existing service centers and other work locations) do not have any room to store and maintain the mutual aid bucket trucks.

One of the key benefits of the Storm Resilience Center related to the reduction of outage recovery times for customers is its ability to house and provide equipment and support to mutual aid crews flown in from outside the region. The Company relies on mutual assistance resources when planning for and recovering from major storm events. Ideally, commitments can be obtained from neighboring utilities for the provision of support because of their proximity and familiarity with the area. Unfortunately, for most impactful storms, neighboring utilities need to retain resources for their own readiness for potential storm impacts and may also be attempting to acquire additional support through mutual assistance as well. Instead, the Company typically secures mutual aid support crews from utilities and contractors that are far enough away from the storm's path to be reasonably confident of no local impacts. The mutual assistance resources then, typically, either wait until the storm has passed before deploying to Con Edison's and O&R's service territories or travel part of the way and stage closer but still far enough away to avoid potential storm impacts, traveling the remaining distance once the storm has passed. These resources typically travel in their own bucket trucks or other utility vehicles that they then use while assisting with the restoration of Con Edison's and O&R's systems.

The Storm Resilience Center expands the pool of available mutual assistance resources and facilitates faster deployment of these resources by providing full, on-site support for these resources including vehicles and tools needed for system restoration. Without the need to also supply their own utility trucks and tools, resources from further distances (away from any possible storm impacts) can be committed to support Con Edison and O&R early, can be flown in prior to the storm, and housed on-site, ready to begin restoration activities as soon as the storm has safely passed without additional travel time. In addition, if the impacts of a weather event turn out to be more extreme than anticipated, Storm Resilience Center also provides the same flexibility to fly in additional mutual aid resources immediately after an event, avoiding the same delays associated with mutual air resources driving as described above.

The primary enabler of this reduction in the time to restore the system is elimination of the need for all mutual assistance workers to drive the utility vehicles that they will need to perform field work on Con Edison's system from their base location. Instead, the vehicles and tools needed by these crews will be purchased and housed and maintained at the Storm Resilience Center expressly for this purpose. Provision of on-site lodging and personal support for up to 500 mutual assistance resources at the Center enables on-site training/system familiarization of resources prior to, during, and immediately after the storm and faster deployment to the field.

In addition to directly supporting restoration crews during extreme weather events, the Storm Resilience Center will also serve as a year-round resiliency center of excellence. The Center will be able to centralize expertise and training in order to enhance the Company's ability to respond to extreme weather events through training, exercises, and drills.

The training value of the Storm Resilience Center will also extend beyond Con Edison and O&R employees. The Center will be able to offer training as well as opportunities to coordinate and conduct drills with first responders, municipal officials, telecom companies, and other utilities. One example could be crew guide training for both Company resources and those from other utilities. Another example of this training for municipal officials and first responders could be on the identification of downed wires and associated hazards. Instruction on being able to identify a downed electric wire, versus things such as telecom wires or guide wires would create greater accuracy in the identification process as well as allowing the Company to get the right resources needed for the job to the location in a more efficient manner. The Center could also serve to provide education to the public related to extreme weather events (such as education on storm preparedness, safety education (e.g., down wires), and conservation measures during heat events for example).

Further, during actual extreme weather events, real-time coordination between all the above stakeholders can take place at or be based at the Storm Resilience Center. Finally, if the situation permits, the Storm Resilience Center could also be used by neighboring utilities during extreme weather events impacting their service territories. For example, during Winter Storm Sage in March 2023 the impacts to Con Edison and O&R service territories were less severe than anticipated, but the impacts in neighboring Central Hudson territory were more significant. Mutual aid resources flown in by Con Edison were released and successfully repurposed to support Central Hudson recovery efforts. This included the use of the Con Edison vehicles purchased and maintained for mutual aid resources. In this case, Central Hudson provided the funding for the use of these resources from the point when they were released by the Company.

Justification Summary:
Following Superstorm Sandy, Con Edison worked with a Storm Hardening and Resiliency Collaborative to recommend storm hardening investments and one of the recommendations was to conduct a Climate Change Vulnerability Study (CCVS or the Study). The initial Climate Change Vulnerability Study was conducted in 2019 and was updated in 2023. The approach followed a multi-step process that cycled through the steps for each potential climate hazard, incorporating feedback from stakeholders throughout the evaluations. The Study used the best available science to evaluate the sensitivity of Con Edison's electric system to projections of potential climate hazards including:

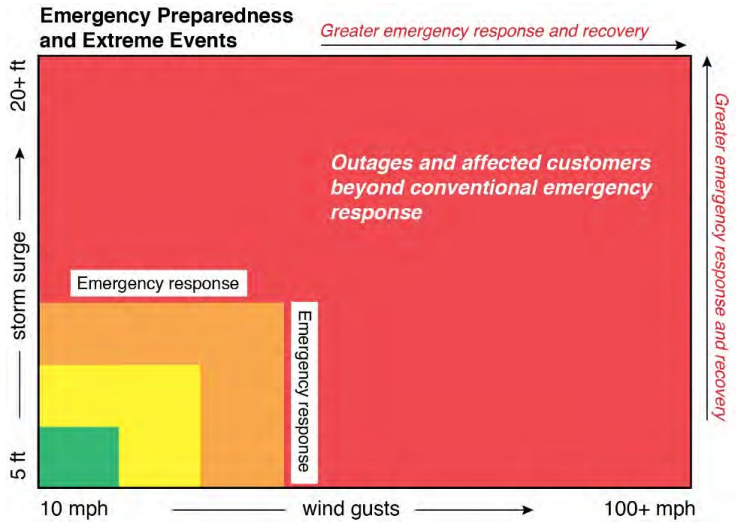
- **Temperature and humidity** – from heat and coincident high heat and humidity (known as temperature variable or "TV")
- **Flooding** – coastal flooding from sea level rise and/or inland flooding from precipitation
- **Wind and ice**
- **Extreme and coincident weather events** – hurricanes/wind, extreme heat waves, nor'easters/cold snaps, and multiple concurrent or consecutive extreme events

The hazards that the Study found to pose an elevated risk to Con Edison's assets and operations include heat and humidity, major storms, wind and ice, and extreme events.

	Con Edison's service territory is projected to be impacted by rising temperatures. Those impacts are expected to be amplified during intense heat waves. Increasing TV will cause load to increase, potentially challenging the capacity of the system.
	Con Edison has previously experienced flooding events that have impacted its assets from major storms. Due to future climate projections, that risk is expected to expand in Con Edison's service area, and facilities like substations will be more exposed to flooding.
	Con Edison's overhead distribution system has historically been the most sensitive to wind and ice, due to its susceptibility to tree contact during high wind and icing events.
	Extreme events are low-likelihood, high-impact scenarios that can amplify and compound the types of impacts anticipated from changes in temperature, sea level rise, and other variables. These events pose risks to all aspects of the system and are especially impactful for emergency response planning.

Specific projections of future climate conditions, referred to as pathways (Pathways) were incorporated into the Company's forecasting and planning processes – including load forecasting, load relief planning, reliability planning for the sub-transmission and distribution systems, asset management planning, facility energy system planning, planning for emergency preparation and response, and worker safety – through the development of a new Climate Change Planning and Design Guideline document (Guidelines). This document specifies the methodologies to be used to evaluate the vulnerability of electric facilities to projected climate changes and establishes specific design standards to be met for each climate hazard over the useful life of the asset.

On an operational level, the increasing frequency and intensity of extreme weather events may exceed Con Edison's and O&R's currently robust emergency preparedness efforts, outpacing current levels of emergency planning and preparedness. The increasing impacts during an extreme event (e.g., hurricane with extreme wind gusts and storm surge) demand correspondingly large emergency response efforts that may exceed those experienced historically. Such events also tend to play an outsized role in shaping the public's perception of climate change vulnerability and how institutions should address its unique challenges.



When choosing resilience strategies to address identified climate vulnerabilities, Con Edison follows a resilience management framework that encompasses investments that:

- Prevent climate change impacts by hardening infrastructure

- Mitigate the impacts from outage-inducing events by minimizing disruptions
- Respond rapidly to disruptions by reducing recovery times and costs

The resilience management framework facilitates long-term adaptation and creates positive resilience feedback so that Con Edison's systems achieve better functionality through time. To succeed, each component of a resilient system requires proactive planning and investments. Con Edison has already undertaken a range of measures to increase the resilience of its systems. For example, lessons learned, and vulnerabilities exposed during past events, including Superstorm Sandy (2012) and the back-to-back nor'easters (winter storms Riley and Quinn, 2018), resulted in significant capital investments to harden the system. With extreme weather events such as these projected to increase in frequency and severity, Con Edison has previously adopted measures that targeted improvements in emergency preparedness including (but are not limited to):

- Improving contractor and material bases for post-storm repair crews and equipment, including the following:
  - Expanding and diversifying spare material inventories
  - Ensuring that all spare materials are housed in safe locations
  - Maintaining a fleet of OH storm response vehicles
- Conducting post-event debriefings to understand the impact of weather conditions on system performance
- Engaging with major telecommunications providers and enhancing communications systems among customer networks
- Facilitating equipment-sharing programs across New York State allows access to supplies during emergency response

Looking forward, as Con Edison is investing in the system of the future—one with greater monitoring capabilities, flexibility, and reliability—and simultaneously building a system that is more resilient to extreme weather events and climate change, Con Edison's comprehensive set of resiliency strategies includes strategies focused on emergency preparedness that limit customer impacts and improve customer coping, including:

- Using smart meters to implement targeted load shedding to limit the impact to fewer customers during extreme events
- Strengthening staff skills for streamlined emergency response
- Planning for resilient and efficient supply chains
- Coordinating extreme event preparedness plans with external stakeholders
- Incorporating low-probability events into long-term plans
- Expanding extreme heat worker safety protocols
- Examining and reporting on the levels of workers necessary to prepare for and recover from extreme climate events

Provision of many of these emergency preparedness services will be implemented through the proposed Storm Resilience Center. Acquiring mutual assistance resources when planning for a storm event is challenging. Neighboring utilities are reluctant to release internal employees or contractor resources until after a storm has passed and this will result in delayed restoration for our customers. Having a storm operations facility with trucks, tools, and materials provides additional options to acquiring resources further away from our service territory quickly and reducing outage durations for our customers. Further, managing the restoration work plan in one location with well-trained and experienced employees will promote safety, consistency, and efficiency.

Relationship to Broader Company Plans, Initiatives and the NYS Climate Leadership and Community Protection Act

Impact on Disadvantaged Communities

The resilience strategies included in Con Edison's Resiliency Plan have been chosen in alignment with our Resiliency Framework that provides guidance for developing a comprehensive set of adaptation strategies to mitigate future climate change risks. This comprehensive set of strategies incudes investments that enable Con Edison's electric system to prevent climate change impacts by hardening infrastructure, mitigate the impacts from outage-inducing events by minimizing disruptions to customers, and respond rapidly to disruptions by reducing recovery times and costs.

While the programs included in the Plan are largely focused on withstanding climate changes and avoiding outages, most programs also enable Con Edison to limit outage impacts on customers (i.e., absorb outage impacts), and restore service more quickly than would otherwise have been possible (i.e., recover quickly). Many of the investments proposed to strengthen Con Edison's ability to withstand extreme climate conditions will also, naturally, significantly reduce the risk of outages during "blue sky" conditions.

Disadvantaged communities (DACs) have fewer alternatives during energy system outages and will be more at risk from climate change. Because of this lack of alternatives, resilient and reliable energy service is an important priority for the communities and for Con Edison. Due to the size of Con Edison's electric system and the population density in the City, almost half of Con Edison's system serves at least one DAC. The company has committed to tracking investments that benefit DACs specifically and to measuring and monitoring system performance in DACs and non-DACs. This tracking process will provide data and allow the Company to evaluate the benefits its investments to customers in DACs and revise its investment approach if needed.

The Company has also formed an Environmental Justice Working Group under an executive committee and plans to release a finalized Environmental Justice Policy Statement in 2023 to apply an equity lens to resilience-driven investments. Key components of the upcoming policy statement include:

- Operations will not disproportionately burden DACs.
- Con Edison will work to understand DAC concerns.
- Clean energy investments will benefit DACs.
- Con Edison will provide opportunities for employment in the clean energy future.

These equity considerations will help inform resilience plan investments moving forward.

Impact on Greenhouse Gas (GHG) Emissions

The primary goals of the programs and projects included in the Climate Change Resilience Plan, including the Storm Resilience Center program, are to withstand, absorb, or recover from the impacts of future climate changes on Con Edison's electric system. While none of the programs are focused on reducing GHG emissions, some of the programs could have small but positive impacts on Con Edison's overall GHG emissions, and none of the programs should negatively impact Con Edison's overall GHG emissions.

All of the programs that prevent or reduce the number of "truck rolls" required to assess, operate, or restore the electric system (i.e., the number of physical trips made by operators, technicians, and other field personnel to physical field locations) will reduce Con Edison's overall GHG emissions by reducing vehicle emissions associated with each field trip prevented. The proposed Storm Resilience Center is likely to reduce overall GHG emissions by eliminating mutual assistance long-distance trips in utility trucks, by assigning work to field crews based on location proximity, and by eliminating individual crew trips to warehouses to pick up material. Actual program reductions in GHG emissions from reductions in physical trips to the field depend on the

number of trips avoided, the miles driven per trip, the type of vehicle, the type of fuel burned, and the condition of the vehicle.

Impact on Clean Energy Commitment
N/A

Impact on 5-year and long-range plans (10-year)

The Store Resilience Center supports Con Edison's integrated strategy, included in the January 2022 Long-Range Plan, focused on four strategic objectives related to Clean Energy, Climate Resilience, Core Service, and Customer Engagement. Con Edison's Climate Resilience strategic objective aims to increase the resilience of the energy infrastructure to adapt to climate change. Furthermore, Con Edison sees the role of utilities as changing from providing, "Universal access to energy that is safe and reliable" to providing, "Universal access to energy that is safe, reliable, and *resilient* (able to prevent, mitigate, and recover from events.)" (emphasis added)

The Storm Resilience Center directly supports the Company's goal of recovering from outage events quickly.

Impact on Company Risk Mitigation Activity
Resiliency, in simple terms, can be defined as having the capacity to withstand or to recover quickly from difficulties. While a bit more complex, Con Edison's Resilience Management Framework definition of resilience is very similar – i.e., the Framework identifies resilience strategies as investments that enable Con Edison to withstand changes in climate and avoid outages, absorb impacts from outage-inducing events by limiting the number of customers impacted or improving the customers' ability to cope with outages, recover quickly, and advance to a better state. Both equate resilience with the avoidance or limitation of difficulties or negative consequences – i.e., with the mitigation of risk. The Storm Resilience Center helps reduce the risk of prolonged outages caused by more frequent and severe weather events.

2. Supplemental Information

Alternatives
Alternative 1
Regarding creating a storm resilience facility for out of area mutual aid crews and have designated vehicles and equipment, an alternative would be to increase our internal Company overhead workforce and purchase vehicles and/or increase contractor resources. These options were considered but deemed not practical because non-storm related work does not support additional resources in the order of magnitude required to effectively respond to major storms. It is more effective to have storm vehicles ready at a moment's notice and acquire mutual aid resources from further away to help meet customer expectations.

Alternative 2
An alternative to having a storm resilience facility for out-of-area mutual aid crews and designated vehicles would be to secure needed mutual aid resources before a major storm. This would be done based upon the weather forecasts. This approach often results in difficulties securing needed resources. Specifically, there are a finite number of mutual aid resources and events impacting the east coast will result in all local mutual aid resources being secured by near-by utilities in the storm's path. Thus, requiring utilities to seek mutual aid resources from further way before the projected storm reaches the service territory. This now increases travel time/delays resource arrivals or results

in non-productive time for mutual aid crews arriving at the site prior to the storm. Both options extend the period of time mutual aid crews are engaged and elevate restoration costs.

Alternative 3
The Company constantly monitors the weather and develops a weather risk assessment based upon each forecast. Unfortunately, as we have seen many times, the accuracy of the weather models is very unpredictable with the highest confidence coming the day of a forecasted event. Having vehicles available and ready for deployment allows for the Company to quickly pivot and secure additional resources when needed to support storm response and overall outage duration reductions. Not having this storm resilience facility and vehicles ready will reduce the Company's ability to quickly secure resources during unanticipated and or weather events resulting in more system impact than expected.

Alternative 4
An alternative for having a storm operations center is to manage a major event from multiple company locations. This is not a practical and or desired approach since coordinating storm response priorities, dispatching crews, and overseeing individuals performing their system emergency assignment role in a centrally located area has proven very effective during training and recent mobilizations. More experienced system operators would have the ability to provide direct oversight of cell leads making switch moves on the distribution system. This is a unique skill set and having multiple locations would diminish the Company's ability to provide direct on-site support, closely coordinate crew restoration activities, and efficiently restore the system.

Alternative 5
An alternative to not having a storm resilience facility suitable for onboarding mutual aid, staging vehicles and materials, and housing resources on-site would be to secure various staging areas for vehicles and materials and to utilize available hotels to house resources, as we typically do. This approach has been getting more difficult; in recent, smaller mobilizations, many of our go-to staging areas and hotels have not been available. In larger events, many local hotels are occupied by the public. This results in using other, disperse staging areas and hotels, causing as much as four hours of non-productive travel time daily from hotels to staging areas, reducing crew efficiency and extending outage durations.

Risk of No Action
The Climate Change Vulnerability Study concluded that Con Edison's distribution system is vulnerable to risk of damage from extreme weather events like those that have been experienced in recent history. Modeling performed by climate science experts with input from Con Edison subject matter experts determined that the electric system is most vulnerable to climate-induced changes in temperature/humidity and sea level rise. The Study also confirmed that a growing body of scientific evidence supports the conclusions that projected climate changes project these extreme storm events to be likely to increase in frequency and intensity in the future. Numerous evaluations following actual events have also revealed that the increased frequency of these types of events tends to erode people's ability to cope with and recover from the impacts and that disadvantaged communities are the least able to recover. Not having the storm resilience center supporting the maintenance and storage of 250+ mutual aid vehicles, along with the ability to house resources, will reduce crew productivity and overall restoration efficiency, increasing outage durations.

Non-Financial Benefits

The Storm Resilience Center will better accommodate mutual assistance crews and prepare them for long hours and challenging tasks. The Center will also allow the Company to more effectively and efficiently deploy field crews to address outages. Further, the Center will offer training as well as opportunities to coordinate and conduct drills with first responders, municipal officials, telecom companies, and other utilities. Collectively, the Center will result in reduced outage times, reduced outage costs, and both the Company and community being more prepared to respond to extreme weather events.

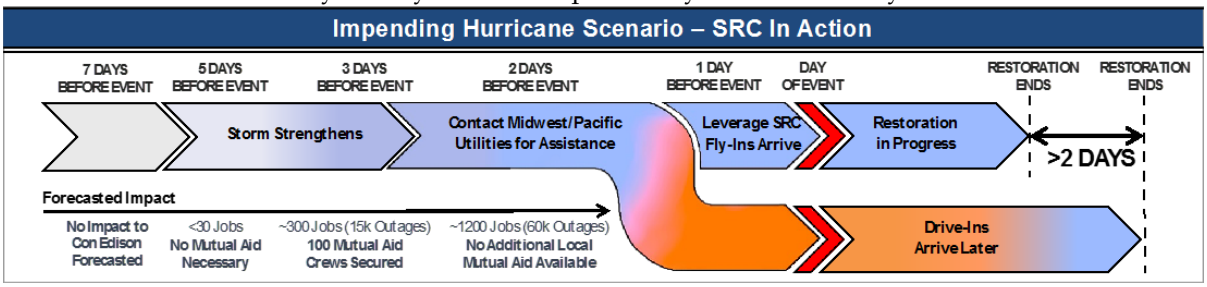
Summary of Financial Benefits and Costs

1. Cost-benefit analysis

The design and functionality of the Storm Resilience Center (the SRC) are focused on increasing the safe, effective, and efficient restoration of the Con Edison electric system following major storms. While the functions proposed to be served by the Storm Resilience Center will support this goal in multiple ways, the largest contributors to reductions in overall outage time come from the ability to:

- Significantly decrease the time needed to engage mutual aid resources and for them to travel to the service territory, and from
- Increases in productivity of mutual aid resources housed on-site

As depicted in the conceptual scenario below, mutual aid crews are typically engaged two to three days prior to a major storm event and take two or more days to drive their own company vehicles to the site with some crews arriving days after the event. With 250+ storm response vehicles stored at the SRC, as many as 250 mutual aid crews (500 people, assuming two-man crews working 12-hour shifts) could fly in to support restoration either right before the event or immediately after, shortening the time needed to restore the system by as much as potentially two or more days.



For each 24-hour period that an outage is reduced in the Company's service territory, Con Edison's customers and the local economy benefit significantly.

In addition, efficiencies enabled by the SRC can significantly reduce the cost of the mutual aid resources needed for restoration by reducing the unproductive crew time involved in typical mobilizations, e.g., unproductive time in transit to and from the Company service territory and unproductive commuting time each day while supporting restoration efforts.

- Typically, mutual aid crews take two to three days to drive to (and from) the service territory, unproductive time that is included in the cost of the restoration. However, the SRC enables 500 mutual aid resources to fly in rather than drive, reducing unproductive time during transit, one to two days per person.
- The SRC will be designed to support lodging for 500 mutual aid personnel on site, eliminating the daily unproductive time these crews spend commuting daily from where they are being housed to the location where equipment is staged and back at the end of their shift.

The actual reduction in mutual aid costs enabled by the SRC cannot be predicted since storm events vary in intensity and the extent of system damage, resulting in differing levels of mutual aid support needed. However, using actual data from one region's experience during hurricane Isaias (mobilizing over 1400 mutual aid resources to restore customers over nine days), we estimated that the overall cost

of mutual aid crews could have been reduced by more than 10% if the Storm Resilience Center had been available. This savings comes from reductions in unproductive time that the Company pays for including time in transit to and from Con Edison's service territory and time commuting to and from dispersed lodging daily. Similar savings in mutual aid costs would be enabled by having the Storm Resilience Center each time mutual aid resources beyond what is locally available are needed for system restoration.

2. Basis for estimate

Planning estimates for the proposed scope (total Company, with CECONY incurring 92.9% and O&R incurring 7.1%) are below.

Storm Resilience Center - Capital Cost Estimate By Year

Component	2025 Cost ($M)	2026 Cost ($M)	2027 Cost ($M)	2028 Cost ($M)	2029 Cost ($M)	Totals ($M)
Land Purchase	26.00	0.00	0.00	0.00	0.00	26.00
Site Planning / Preparation / Drainage / Paving	3.00	18.00	18.00	0.00	0.00	39.00
Main Building Design, Construction, Buildout	0.00	0.00	30.00	30.00	18.00	78.00
Equipment, Furniture, Cabinets	0.00	0.00	0.00	0.00	4.40	4.40
Personnel Support Facilities	0.00	0.00	0.00	0.00	8.25	8.25
Car Port / Clean Energy Solar Farm	0.00	0.00	0.00	11.00	11.00	22.00
Total	**$29.0**	**$18.0**	**$48.0**	**$41.0**	**$41.7**	**$177.650**

Storm Resilience Center - O&M Cost Estimate By Year

Initiative	Component	2025 Cost ($M)	2026 Cost ($M)	2027 Cost ($M)	2028 Cost ($M)	2029 Cost ($M)	Totals ($M)
Annual Maintenance for Land, Property including Security, Landscaping, Miscellaneous Permits	General Property Maintenance / Landscaping	0.000	0.100	0.400	0.750	2.500	3.750
	Security (Fencing, Cameras, Monitoring)	0.000	0.250	0.500	0.150	0.250	1.150
	Miscellaneous Permits and Fees	0.000	0.050	0.100	0.050	0.100	0.300
	Initiative Total	**$0.000**	**$0.400**	**$1.000**	**$0.950**	**$2.850**	**$5.200**

Project Risks and Mitigation Plan

Risk 1 – Disruption to Critical Operations

Risk 1 Mitigation plan

Complete the ongoing feasibility study of two Company owned sites for the Storm Resilience Center. In parallel develop a detailed schedule to design, construct, test, and commission the Storm Resilience Center and have any services provided by the Pomona location today in place before terminating the lease on the current Pomona facility.

Risk 2 – Schedule Delays (including ability to locate a suitable property)

Risk 2 Mitigation plan

Continue to refine the scope and cost of all Storm Resilience Center focus areas; monitor and update preliminary cost estimates as required. Adjust prioritization, if needed, to establish initial operational capabilities for the Center.

Technical Evaluation / Analysis

N/A

Project Relationships (if applicable)

N/A

3. Funding Detail ($000)

2019-2024 Actual/Forecast Spend – TOTAL COMPANY

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Forecast 2023	Forecast 2024
O&M	–	–	–	–	–	–
Capital	–	–	–	–	–	–

2025-2029 Request:

Total Request by Year:

	Request 2025	Request 2026	Request 2027	Request 2028	Request 2029
O&M	**$0**	**$400**	**$1,000**	**$950**	**$2,850**
Capital (Total)	**$29,000**	**$18,000**	**$48,000**	**$41,000**	**$41,650**
Labor	$376	$388	$489	$493	$500
M&S	$188	$698	$4,644	$3,540	$12,650
Contract Svcs.	$2,989	$12,338	$30,305	$26,149	$17,337
Other	$18,197	$78	$562	$567	$750
Overheads	$7,250	$4,500	$12,000	$10,250	$10,413

Long Range Funding Projections

	2030-2034	2035-2039	2040-2044
O&M	**$15,585**	**$18,067**	**$20,945**
Capital	**$0**	**$0**	**$0**
Basis for funding direction:	Final building commissioning and ongoing facility maintenance escalated annually for inflation-related increases (3%)	Mutual assistance mobilization enhancements, ongoing facility maintenance escalated annually for inflation-related increases (3%)	Mutual assistance mobilization enhancements, ongoing facility maintenance escalated annually for inflation-related increases (3%)

2019-2024 Actual/Forecast Spend – CECONY (92.9%)

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Forecast 2023	Forecast 2024
O&M	–	–	–	–	–	–
Capital	–	–	–	–	–	–

2025-2029 Request:

Total Request by Year:

	Request 2025	Request 2026	Request 2027	Request 2028	Request 2029
O&M	**$0**	**$372**	**$929**	**$883**	**$2,648**
Capital (Total)	**$26,941**	**$16,722**	**$44,592**	**$38,089**	**$38,693**
Labor	$349	$360	$454	$458	$465
M&S	$174	$648	$4,314	$3,288	$11,752
Contract Svcs.	$2,777	$11,462	$28,154	$24,293	$16,106
Other	$16,905	$72	$522	$527	$697
Overheads	$6,736	$4,180	$11,148	$9,523	$9,674

Long Range Funding Projections

	2030-2034	2035-2039	2040-2044
O&M	**$14,478**	**$16,784**	**$19,458**
Capital	**$0**	**$0**	**$0**
Basis for funding direction:	Final building commissioning and ongoing facility maintenance escalated	Mutual assistance mobilization enhancements, ongoing facility maintenance escalated annually for	Mutual assistance mobilization enhancements, ongoing facility maintenance escalated annually for

	annually for inflation-related increases (3%)	inflation-related increases (3%)	inflation-related increases (3%)

2019-2024 Actual/Forecast Spend – O&R (7.1%)

	Actual 2019	Actual 2020	Actual 2021	Actual 2022	Forecast 2023	Forecast 2024
O&M	–	–	–	–	–	–
Capital	–	–	–	–	–	–

2025-2029 Request:

Total Request by Year:

	Request 2025	Request 2026	Request 2027	Request 2028	Request 2029
O&M	**$0**	**$28**	**$71**	**$67**	**$202**
Capital (Total)	**$2,059**	**$1,278**	**$3,408**	**$2,911**	**$2,957**
Labor	$27	$28	$35	$35	$36
M&S	$13	$50	$330	$251	$898
Contract Svcs.	$212	$876	$2,152	$1,857	$1,231
Other	$1,292	$6	$40	$40	$53
Overheads	$515	$319	$852	$728	$739

Long Range Funding Projections

	2030-2034	2035-2039	2040-2044
O&M	**$1,107**	**$1,283**	**$1,487**
Capital	**$0**	**$0**	**$0**
Basis for funding direction:	Final building commissioning and ongoing facility maintenance escalated annually for inflation-related increases (3%)	Mutual assistance mobilization enhancements, ongoing facility maintenance escalated annually for inflation-related increases (3%)	Mutual assistance mobilization enhancements, ongoing facility maintenance escalated annually for inflation-related increases (3%)

Appendix 6: State of the Literature on Resilience Performance Measures

Across utilities (and indeed regulators), there is no agreed upon way to measure resilience. Development of grid resilience measures is an active area of research and industry discussion. Significant work is ongoing in the National Labs to develop and implement metrics for appropriately quantifying resilience, including a multi-year project under the United States Department of Energy's Grid Modernization Laboratory Consortium (GMLC)[27], and a new study that was just kicked off by NYSERDA to develop and pilot potential measures. The GMLC work focused on outcome-based performance measures, which seek to provide a quantitative analysis of the resiliency of a system. For example, the GMLC work proposed measures such as cumulative customer-hours of outages and cost of electric grid damages.

There are several other approaches for quantifying various elements of resilience that have emerged in industry literature and practice. For example, Sandia National Laboratories[28] has made progress toward developing an implementation approach for outcome-based measures. As shown in Figure 7 below, this approach features the Resilience Analysis Process (RAP). This work notes that, "grid resilience metrics should quantify the **consequences** [emphasis added] that occur as a result of strain on or disruption to the power grid." These consequences may be measured in terms of *direct* consequences, such as unserved energy, or *indirect* consequences, such as interruption costs or population without power.

Figure 7. Resilience Analysis Process for Performance-Based Resilience Metrics (from Watson et al. 2014)

Rather than offering standardized measures analogous to SAIDI and SAIFI, the RAP offers a framework for developing customized resilience metrics. These emerge from high-level resilience goals identified in the first step of the process, which includes consideration of key stakeholder needs. In this sense, the RAP does not necessarily guide users toward a standardized set of resilience measures that can be applied uniformly.

Other suggested resilience performance measures include:

- Major outage events (MOE), which have varying definitions by state, generally measure the number and duration of customer outages.[29] MOE can more specifically measure resilience by defining the most extreme events and measuring outage events based on a percentage of customers with outages and the length of outages.[30]
- Major event days (MEDs), which measure the days in which SAIDI exceeds a threshold derived from past reliability performance.[31]
- Customer restoration time (CR-X), which measures the number of hours it takes from the start of an outage event to restore power to X percent of the customers of a given utility.[32] This measure helps to understand resilience by emphasizing post-event recovery capabilities.
- Customers experiencing long interruption durations (CELID-X), which is a sustained outage metric that measures the percentage of customers experiencing extended outages

lasting more than X hours.[33] This measure can record resilience information on non-catastrophic events, using CELID-8, and on catastrophic events, using CELID-60.[34]

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